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THE BEST OPERATION FOR THE EXTRACTION OF CATARACT.

By D. B. St. John Roosa, M. D., LL. D.,

PROFESSOR OF DISEASES OF EYE AND EAR NEW YORK POST GRADUATE MEDICAL SCHOOL AND HOSPITAL.—SURGEON TO THE MANHATTAN EYE AND EAR HOSPITAL.

A very important question to the beginner in Ophthalmic surgery, continues to be: What is the best method of extracting cataract? Which is the method that on the whole gives the best prospect to the patient of securing useful vision? A man of large experience in cataract operations, may have some difficulty in answering this question for himself, and how much more for the practitioner who has performed the operation on the dead subject, but perhaps never on the living. There must be a time, however, for the young surgeon to begin, and with which operation shall he begin? My experience now extends over a period of twenty-five years, and I may say frankly in advance, that I shall not be able to answer this question unreservedly; that is to say without exceptional clauses in any statement I may make.

I was taught to perform the operation for extraction with the triangular Beer's knife, without an iridectomy. The operation for cataract performed with this knife, was I think one of the most difficult of all surgical procedures. We then had no cocaine, and when we used ether or chloroform, we had dangers following from the use of the anæsthetic itself, while we had also the dangers of failure in the technique of the operation. A good many of these difficulties have not proved to be as serious as time goes on, and experience accumulates, as they were once supposed. For example the operator was advised to withdraw the knife if he cut the iris in making the section, to wait for the wound to heal and then to begin again. We now know that the cutting of the iris through the too sudden evacuation of the anterior

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chamber and the premature escape of the aqueous humor, is not after all, a very detrimental thing to the success of the operation. It was the shape of the knife that made the whole operation so difficult. With Graefe's narrow knife, it has become much more easy to extract the lens without injuring the iris. Graefe's modification of the old flap operation came into practice about the year 1866. It was hailed with great approbation on almost every hand. But finally all of its distinguished features, that is the section in the sclera, and the attempt at a linear wound instead of a flap, were abandoned and there is nothing left of the Graefe operation but the knife and the iridectomy.

Liebreich's operation of a small flap well in the cornea, was suggested by him in 1874 or '75. I saw him perform it on several patients in London, in 1876. It is by no means a bad operation—it is usually very easy to perform, its chief difficulty being that adhesion of the iris to the wound is quite likely to occur, but as will be seen by a recent paper by myself in the *Archieves of Opthalmology*, of six extractions by this method all were successful at my hands, and although I abandoned it, I by no means consider it a bad method.

I have made some trials with an operation for extraction of the lens in its capsule, and I invented a method for accomplishing this which is characterized by the dislocation of the lens with the back of the knife, after making a counter puncture. The lens is caused to emerge by pressure on the cornea, and on the lip of the wound. I had hoped that this operation would bring immunity from subsequent operations for obstruction of the pupil, but I found that opacities in the vitreous, very anterior opacities, required division in some of these cases also, and therefore the operation which is a difficult one to perform, and which is rather apt to entail some loss of vitreous, has been given up by me, except in rare instances, where the lens is seen ready to come out as soon as the section is finished.

I then returned to simple extractions with a narrow knife, performing iridectomy if necessary at the time of the operation. That is to say, in case the iris was cut during the section, or in case it prolapsed in such a way as to make it difficult to restore it perfectly to its normal position. Added to this, I wash out the anterior chamber, when much cortical material is left behind. The syringe of *Panas* is a very good instrument for this purpose. A solution of boracic acid is the fluid I use, as Panas himself now does. For cataract in young persons, or cataracts that are apparently very soft, the old linear operation; that is a section with an iridectomy knife, and capsulotomy, and subsequent evacuation of the semi-fluid constituents of the lens, is a good method—one that is of more general value than I think is generally supposed.

In case a cataract is very slow in ripening, and the fundus is not

healthy, I think well of a preliminary iridectomy with Foerster's massage, but we must not expect such good results from operations in which this is performed, for they are necessarily not as good typical cases of senile cataract as in the other forms, and Foerster's operation does not always hasten the ripening of the cataract.

I am inclined then to answer the question that heads my article, by saying that I prefer the simple extraction for straight forward cases of senile cataract, reserving linear and preliminary iridectomy for exceptional ones.

As for subsequent treatment, if there be no indication of an unruly disposition in the patient, I operate on a table in the operating room, afterward lifting the patient to his bed. But if there is any doubt as to the behavior of the patient, or when he is very feeble, or when other circumstances render it necessary and better, I prefer to operate on the bed on which he is to lie afterward. I am not so strenuous as to a fixed recumbent position as formerly. I allow a good deal of latitude in this respect. When things are going well, I let a patient sit out of bed on the third day, and sit up in the bed the second.

I use Graefe's bandage, with absorbent cotton, instead of the picked lint which he formerly used. I drop in half a grain to the ounce solution of eserine immediately after the operation, and I do not allow the eyes to be opened unless severe pain supervene, until from four to six days after. To secure primany and permanent union, such precautions are not always essential, but on the whole I think they give the patient the best chance.

In case senile delirium occur, I give the patient much more liberty, seeing only that a nurse is by his side night and day. In many cases, the removal of the bandage from the unoperated eye is a great relief. The isinglass plaster dressing I tried faithfully, when it was first advised by the late C. R. Agnew, but I found it much inferior to the flannel bandage.

CALCIFICATION OF ENTIRE CAPSULE, EMPTIED OF ITS LENS AND HELD IN POSITION. RESULT OF SEVERE INJURY.

By Middleton Michel, M. D.,

PROFESSOR OF PHYSIOLOGY AND MEDICAL JURISPRUDENCE, MEDICAL COLLEGE OF THE STATE OF SOUTH CAROLINA, CHARLESTON.

Cretaceous and ossific formations within the eye are known to occur, but they are not of such frequency as to make the recital of such very rare instances in an oculist's experience wholly uninteresting.

Always the result of demolitionary influences and of even suspended nutrition in yet living delicate structures, it is strange that calcification

as a degenerative transformation of the tissues is not more frequently encountered in the panophthalmitic eye-ball. Among the number of eyes that have required evisceration, enucleation, or any other surgical attention, it is strange that I have once only met with the pathological condition to be described.

The circumstances of the case presenting this specimen were associated directly or coincidently with severe injury of the eye, in one whose impaired vision necessitated the use of spectacles. In moving round suddenly the right eye struck against a post projecting beneath a piazza, crushing the spectacles and driving a fragment of glass into the eye. A year after the accident, his physician discovered a cataractous formation and sent the patient for its removal. The eye presented a puckered and withered appearance; through the pupil a pearly white nacreous product was discernible pressing upon the iris to which it seemed attached. Indications of destructive changes were apparent in this phthisical eye. Subsidence of inflammatory action had long since occurred and had left little, if any, light perception. At the patient's request the removal of the cataractous product was undertaken for cosmetic purposes, as no promise of sight could be offered. The operation was performed in the presence of Dr. Williams, of Georgetown, who sent the case to me, and Drs. Butler, E. Wasdin, and others. The linear incision with a free iridectomy discovered a firm concretion of the capsule; the cretaceous formation gritted perceptibly against the cystotome, and was of such hardness that it could not be severed readily from its zonular attachment; the wound was enlarged with the probe-pointed secondary knife; finding the delivery of the product yet diffiult with curette, it was seized by the forceps and extracted finally with some loss of vitreous.

This unique specimen was supposed, at first, to be a chalky concrement of the lens that has too often been referred to as ossification, but it proved to be a complete calcification of the entire capsule free from any trace of lenticular substance. It maintained its capsular shape with a cavity widely opened with its anterior and posterior halves rigidly held apart by a very thick cretaceous deposit on all sides.

This curious pathological specimen presents a striking miniature resemblance to a "bachelors button," such as is found upon our seashore; a species of echinoderm, known to naturalists as echinus or sea urchin, whose tegumentary characteristics lost by desiccation and edysis of its spines, presents a perfect shell-like cup with all the variegated markings of its complex structure. It is needless to add that no perception of light followed the operation, which improved the general appearance of the eye, and is memorable only in having furnished this unique specimen of capsular disease.

There are curiosities in pathology of no direct practical importance, though perhaps there are no facts in science but have their practical significance upon some line of inquiry.

Concerning such developments within the human eye, as the one to which this brief notice is given, we may very naturally desire to know more of its real character and mode of origin.

The early writers refer to ossification of different parts of the eye, as of the lens, its capsule and other portions even of the iris itself; but the question arises whether these were instances of bony transformation, or of calcification; and whether any difference exists in conditions that conduce to the production of two very dissimilar degenerative processes.

Ossification occurs most frequently perhaps in close vicinage to capillary blood vessels, that pour out plasma into a proliferating group of cells, which appropriate and use up all the inorganic products in the exudate as building material for osseous tissues, modifying, incorporating and methodically redepositing these indiscernible lime salts into a bony fabric, similar to that low osseous structure that exhibits simple multiplication of bone cells and canaliculi without progressing to the formation of concentric laminæ around haversian canals—indeed, without forming exactly true bone. Such evolution of bony texture undoubtedly occurs in the eye, most examples of which have been found in direct contact with the vascular choroid which supplies exactly the conditions above suggested. The cause of such a product precisely in such a locality is probably some impairment or obstruction in the circulation of the part resulting in a thrombus; the whole phenomenon, there, is one of activity occurring in or about some vascular area amid tissues of impaired vitality, whose cells still continue to exhibit imperfect functional activity.

Calcification, on the contrary, is a purely passive process of simple filtration of blood salts into non-vascular, unorganized structures, whose impaired condition through direct injury permits stagnation of these inorganic materials to accumulate locally; presenting no methodical arrangement of histological elements, but only an aggregate of molecular granules deposited irregularly throughout the part; —a purely passive infiltration, nowise dependent upon circulatory interruption, (as there are no vessels in a non-vascular tissue), but upon inability on the part of the injured tissue to appropriate nutritive plasma. The matrix of the tissues calcifying is simply permeated by earthy salts without itself presenting any trace of newly formed structure.

Now, this condition is just such as becomes possible in old cases of injury that slowly have produced marked intraocular disease, especially where traumatism takes place in unorganized extravascular

regions, such as the lens or its capsule. In such situations it is doubtful whether ossification can really occur.

The specimen here described is one then of calcification of the entire capsule emptied of all lenticular substance; not one of ossification as it would have formerly been termed. Its occurrence appreciatingly considered is readily understood, the only surprise being that similar instances have so rarely been met with. In this case the severity of the injury reached both capsule and lens, the rupture of the former allowed penetration of the aqueous so that the lens became diffluent, slowly escaped and was absorbed. The age of patient ensured this as he was young, for such an event is not likely to happen after middle age in consequence of the hardness of the lenticular nucleus that rarely yields to the solvent influence of the aqueous. That this occurred slowly is most evident, for the rapid escape of the lens would have caused collapse of the capsule; but here on the contrary, time permitted the progressive and gradual deposition of cretaceous molecules so slowly that the capsular halves were sustained apart and retained their saccular shape. It is precisely this mode of formation that gives value to this beautiful specimen in my possession. After escape of the lens from any cause, its capsule invariably tends to collapse, its halves falling together immediately, coalescing completely as a pillow case when its pillow is removed.

I have several times met with a dense layer of capsule quite difficult to lacerate, extending across the area of the pupil, forming a veritable partition behind the iris, that was thus produced by capsular layers in adhesive apposition. Penetrating wounds of the eye involving capsule and lens are followed by opacity of the capsule and destruction of lens substance in one way or another; sometimes retention of lenticular substance thickens the capsule, fatty degeneration subsequently softening its floating layers and contents; and should iritic complications produce intra-ocular inflammation lymph thrown out upon the capsular fragments consolidates into firm, dense fibrous shreds adhesively connected with surrounding parts, finally obliterating the pupil. In this more destructive condition of the eye, after the expiration of a certain time, it occasionly happens that deposits of earthy salts are found in scattered patches over these vestiges of structure in the track of the wound giving to these a brittle, friable character. But the unexpected accident that, in our case, produced so strange a petrification of the capsule *in situ*, without a relic of lens substance within its patent cavity, so perfectly calcified as to have prevented any shrinkage, change of curvature, or reduction of equatorial diameter and to have conferred upon it so perfect a resemblance to the well-known little invertebrate to which I have likened it; is an event so very rare indeed, that I have thought this recital would especially interest the reader.

83 Society Street, Charleston, S. C., Nov. 30, 1891.

COCAINE ANESTHESIA FOR ENUCLEATION OF THE EYE.

By Edward Jackson, M. D.,

PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC, AND SURGEON TO THE WILL'S EYE HOSPITAL.

While cocainization has replaced general anæsthesia for the great majority of the operations done in ophthalmic practice, the limits of its usefulness in that indicated by the heading of this paper are not entirely settled. Probably most surgeons regard the enuclation of the eye as always calling for the use of a general anæsthetic, but a few report that they do the operation with the aid of cocaine anæsthesia alone.

The writer's experience in this direction began with the attempted enuclation of an eye long blind, containing a foreign body, and which had become violently inflamed a few weeks before, and had caused sympathetic irritation in the other eye. A four per cent solution of cocaine of proved efficiency, was freely instilled in the conjunctival sac, and then injected into the orbital tissues with a hypodermic syringe, with a freedom that would now be regarded as dangerous. The patient was a strong young laboring man, and the operation carried forward as rapidly as possible; but the evidently intense suffering of the patient, led to the completion of the enucleation under chloroform.

This was in the early weeks of our acquaintance with cocaine as an anæsthetic, and the one experience led the writer not to make a second attempt for some years. As we became more familiar with the effects of the drug however it was noticed that its power of producing insensibility was very slight when the tissues to which it was applied were actively hyperemic or inflamed; and the idea occurred to the writer that probably this was the explanation of the failure in the above case. Its very satisfactory influence for tenotomy or advancement operations, made it seem probable that with the tissues in a similar condition of freedom from hyperemia it should answer for the enucleation of the globe. A patient requiring the enucleation of a globe quite free from hyperemia, and desirous of avoiding the use of ether, offered the opportunity for another trial. In this case the result was perfectly satisfactory, there being no complaint or evidence of severe pain. Certainly the pain was less than in the average operation for advancement of a tendon.

From that time the writer has used cocaine for the enucleation of all eyes free from hyperemia, and has encountered but little more difficulty and caused but little more suffering than attends an ordinary squint operation. For the enucleation of hyperemic eyes, which are a majority of those requiring enucleation, the use of ether is still resorted to.

For enucleation, cocaine is to be used very much as for an ad-

vancement, but more freely. A four to ten per cent solution is instilled freely into the conjunctival sac at intervals of two or three minutes, for fifteen or twenty minutes before the operation is commenced. During the operation the cut tissues may also be bathed with the solution, but this part of its use is comparatively unimportant. No attempt is made to inject it in the deeper tissues. The most painful part of the operation is, as in squint operations, the dragging on the tendons of the recti muscles. And the total pain caused will depend mainly on the gentleness or rudeness exhibited in this portion of the operation.

THE PRACTICAL ADJUSTMENT OF SPECTACLES.

By George M. Gould, M. D.

OPHTHALMOLOGIST TO THE PHILADELPHIA HOSPITAL, PHILADELPHIA.

I can think of no possible book that is more needed for the medical good that it would do, than a first-class handbook for opticians. Such a book should be written by one or more opticians of long experience and of more than average intelligence, with the aid of a competent oculist. It should be profusely illustrated in order to show in the simplest and plainest way the best methods of constructing spectacles and of adjusting them to the peculiarities of each face so that they shall not only be perfect optical instruments but also and thereby the best means of therapeutics in the physician's hands. It must never be forgotten that every pair of spectacles has a medical significance, and every suggestion here offered is written with the conviction of its medical influence. It is a strange and sorry absurdity that seems to impel opticans towards taking upon themselves the physician's duty of prescribing, shamefully forgetting and neglecting the veriest rudiments of their own peculiar work. If they cannot and actually *do* not make proper optical instruments and fit them properly, it is hardly probable that they will be able to prescribe them. It is an old saying that faithfulness in a few things brings rulership over many. If one would in any city, take a hundred spectacle-wearers passing any door it would be found that not ten per cent. had properly-made, and fittingly-adjusted frames. This is not indeed, wholly the optician's fault, because the best spectacles are often rendered ill-fitting by the wearer's carelessness and ignorance of how to care for them. But even here there is some blame due the optician, because he should have it distinctly understood with his customer that all spectacles need readjustment every month. More than this, the optician should give every customer a pamphlet or slip of instructions as to how to wear and care for his spectacles, and how he may know when they are out of adjustment.

But the wearer's carelessness is not by any means the chief cause of the trouble. Rightly, mechanically, and conscientiously made and fitted at first, spectacles do not get out of adjustment with the quickness that the good-for-nothing trash does that is commonly sold.

My present interest in the matter is one born of a conviction that is the result of every day's experience, that physicians themselves are sadly neglectful of the therapeutic importance of these facts. I myself have been so and I know that others are. The optician's neglect is partially excused by that of the oculist, and their common dereliction of duty is the patient's common misfortune. The oculist's duty is not ended with writing the prescription for glasses nor that of the optician by selling them. Patient and customer must be warned as to the danger of ill-fitting glasses, and promises exacted as to frequent returns to physician and to store, in order to make quite sure that frames are kept straight and properly adjusted.

The failure of oculists to realize the importance of proper frames and adjustment is clearly shown by the fact that in no treatise on refraction or ophthalmology is the subject adequately treated. In hardly one is it even mentioned, whilst hundreds of other matters of far less importance are discussed in pages and chapters.

My interest in the fact is purely medical and no fact has been more commonly impressed upon my mind than this of the harmful effects of ill-made and ill-fitting glasses. There is hardly a day that, despite all warnings and cautions, patients do not return to me with complaints of recurrence of all old-time headaches, reflex troubles, and ocular symptoms. A glance at the spectacles shows the *fons et origo mali*, and they are at once sent to the optician, with a speedy disappearance of the symptoms so soon as readjustment has been made. Of what use is it to work for an hour to rightly estimate an astigmatic axis and degree, if a twisted lens undoes all work? Of what use to estimate ametropia and muscle-imbalance if improper centering of lenses and, adjustment of frames turn our prescriptions into prisms? If we believe that uncorrected ametropia is of vast significance in occasioning disease and morbid reflexes, then we must logically conclude that an ill-adjusted glass uncorrects our correction, and brings about again what we had aimed to remedy.

There are many and intricate mathematical estimates and calculations possible as to the prismatic effects of decentered and mal-inclined lenses, but such questions I shall not presume to discuss, contenting myself instead with a few of the simplest and crudest suggestions concerning aspects that are brought home to my attention by daily experience. I shall speak at first only of spectacles, leaving the eyeglass question for separate consideration.

I allow patients to choose whether their spectacles shall be "rimless," or with eye-wire, but strongly urge the advisability of "hooks."

1. If of gold, the frame should be "14 karats fine." This insures the greatest degree of hardness, temper, and durability. It is possible that the new alloy of aluminium and nickle may prove of great service, but at present gold frames are the most advisable; steel frames, if carefully nickelled, will be of more service than the plain steel. The question of expense at once arises. The 14 K. gold frames of the proper weight or quality of metal, of course cost much more than the fragile sort of the 8 K., or even 10 K. degree of fineness commonly sold. The oculist may encourage the patient to buy such expensive frames by the assurance that they are "cheaper in the long run," but more rightfully by emphasis of the medical aspect of the question. Most patients, even the poorest are determined to have gold frames. It were better to have a heavy rigid steel frame than a flimsy, wabbling, gold one. It is the silliest folly to allow a patient with reflex symptoms and of a sensitive nervous temperament to wear the limp, stringy bridges and frames that tradesmen who know no higher law than money-getting will shamelessly sell.

2. A very large proportion of the spectacle-frames sold are of too light weight. There is not enough metal to insure the proper rigidity and preservation of shape. With the usual thin and light bridges and temple-pieces they must necessarily become bent out of shape in a short time. Moreover, when so fragile, the lens is shaken with every step or movement of the head, and a dancing, inaccurate image is thus constantly thrown upon the retina, inevitably producing ocular labor and weariness. A frame should be so solid and so solidly set as to allow of no quivering of the lenses. The heavier the lenses the more necessary is a solid rigid frame.

The so-called "swelled bridge" is a nuisance. It is indeed desirable to have the broad, bearing-surface upon the crest of the nasal bridge, but this must not be obtained at the expense of the metal in the arms, as is done in the swelled bridge. The bridge in its entire length should be of uniform weight. The bridge, arms and all, even in the heavier frames should have a rigidity greater relatively to the rest of the frame than is commonly the case, in order to gain the desired stiffness of the whole mechanism.

3. Vibration, quivering, or insecurity of the frames, with motion of the head, or in walking, must be avoided. The means to be taken to render these impossible are:—

a. Sufficient heaviness and rigidity of the whole frame and especially of the bridge.

b. Absolute lack of looseness, or "play" of the fastenings of the straps of the bridge and end-pieces, and of the end-piece joints.

c. A bridge that fits the peculiarities and irregularities of the nose, and the sides of which are in apposition with the sides of the nose.

d. Straight non-curving temple-pieces from the end-pieces to the tops of the ear, sharpness of the curve at the top of the ear, and conformity of the wire behind the ear to the curve of the ear.

e. Fitting of the wire behind the ear to the depression next the mastoid process and head,—*i. e.*, non-riding of the wire upon the ear away from the head.

f. And, most important of all, close apposition (without cutting, however,) of the temple-pieces with the skin and scalp of the sides of the head, in so much of their extent as possible.

4. The frames, and especially the bridge, must be so perfectly tempered as to admit of the frequent and extreme bending and shaping always necessary before a perfect fit can be secured.

5. The saddle-bridge must clasp the sides of the nose widely or if you please deeply, and not rest simply upon the crest of the nose. The extent to which this can be done depends upon the height and shape of the nose, and in any case makes necessary a long arm and usually a sharp curve from the bend to the bridge-strap. The saddle-bridge must also clasp the nose closely or be in exact apposition on both sides. There must be no "play," but also of course, no decided pressure upon the sides of the nose. Various devices have been made to lesson or distribute the pressure on the crest of the nose, that is sometimes necessary. A good way is by means of small metal carriers fastened at the lower extremities of the bridge, and holding pieces of cork that rest on each side of the nose.

6. The temple-pieces must be straight from the end-piece to the top of the ear, and the curve must begin at this point with the same degree of sharpness that the curve of the back part of the ear itself has. Nothing betrays more stupidity mechanically than a temple whose curve begins at the end-piece and meanders up through the hair of the head, landing somehow and somewhere behind the ear. There should also be some endeavour to make the curve of the wire behind the ear conform to the inequalities of ear curve. The length of the temple-piece must be right, *i. e.*, made different for nearly each person. The wire is bound to cut the ear or make the lenses sit wrong, unless this is looked after. Sometimes one temple-piece is required as much as one-half inch longer than its fellow, and then much care and ingenuity will be required to insure no maladjustment of the lenses due to this asymmetry of the position of the ears themselves.

7. By general consent the French glass and lenses, known as "the A B frame," are the hardest, purest, and most generally satisfactory. Periscopic lenses in anything but plain sphericals are expensive, and except in sphericals are of doubtful advantage. In sphericals the per-

iscopic form of lens is used up to about 8 D.; above this biconvex or biconcave are preferred. In simple hyperopic astigmatism the plane side is next the eye. In compound hyperopic astigmatism the side having the least curvature is usually placed toward the eye. In simple myopic astigmatism the cylinder should be toward the eye. In compound myopic astigmatism the greater curve is usually placed toward the eye, but there are exceptions to this rule when one must use judgement in each individual case.

8. The optical center of the lenses should be as near the geometrical center as possible. The optical center must be accurately located and indicated by a dot of ink or paint. This spot showing the center should be left on the lenses until the physician has examined the lenses and their adjustment. The axis of astigmatism may also, and especially if not at 90° or 180°, be indicated by a fine ink-tracing across the lens. To test the accuracy of the axis-placing, the stenopaic slit in the trial frame may be put over the adjusted spectacles and the coincidence of the two lines observed.

9. The optical centers of the lenses must cover the pupils at the most-used position of the eyes. To realize this necessity tests the optician's mechanical skill to the utmost. Because, either,

a. The eye or its pupil upon one side is often at a greater or less distance from the center of the crest of the nose than the pupil of the fellow-eye.

b. One eye or its pupil may be placed higher than the other.

c. The peculiarities of the bridge of the nose, of the eye-brows, or of the contour of the adjacent parts, may demand peculiar adjustments.

d. The habits or occupation of the patient may cause special adaptation, a lower or higher placing, etc.

e. The centers in lenses used for reading alone must be narrower or nearer each other, and lower, than in those for distance alone. For constant use the centering must be a compromise; if the patient be a hard worker at near-range, the adjustment should be almost the same as if for near-work alone; if the patient does little near-work the centering may be almost the same as if for distant use alone. The higher the refractive error, or the greater the reflex symptoms, the more accurate must be the adjustment for the most straining work. In these cases it is better to order two pairs, the refractive power of the lenses, so well as the centering, being more accurately suited to the two purposes of near and distant use.

10. An extremely important thing is the proper inclination of the lens. How often one sees lenses so placed that the axis of vision strikes the lens at an angle as acute as that of the second stroke of a narrow capital letter V. The muscles in such cases are strained, the

light is lost by reflection, the axis of vision pierces the lens at its lower edge thus transforming the lens into a prism—ocular irritation is sure to follow. Since most of our vision is downward, all lenses, even those worn for distant use alone, should be inclined so that the visual axis shall strike the lens perpendicularly when the eyes are directed to the ground, say ten feet in front. If the patient be a hard worker at near-range the inclination should be such that the visual axis is nearly perpendicular when looking at the book, the sewing, or the writing-paper. But all patients should be urged by Doctor and by Optician to use low chairs or high desks, the latter inclined if possible, to get book, newspaper, or sewing up as near to a level with the eyes as possible, and sit up straight.

11. The eye-lashes must not strike the lens; if they do the lens is soon soiled and the eye irritated both by the obscurity and the repeated strokes of the lashes against the lens in winking. When the eye is prominent and the lashes long it is decidedly advisable to trim the lashes a little so the lens can be brought closer to the eye. I have found by many experiences that without this, spectacles would have been a failure. When by long lashes a lens is necessarily placed at a great distance from the cornea there must follow muscle-strain either of the eyes or of the neck. The closer the lens to the cornea, the better.

12. The angle of the bridge with the lenses, and the traction of the temple-piece "hooks" or ear-curves, must be such that the saddle-bridge shall rest in the natural depression or seat of the nose, and the inclination of the flattened part of the saddle-bridge such that neither of its edges shall cut into the nose.

13. All of the above suggestions are to be doubly emphasized in the case of the improved bifocal lenses that I have recommended to the Profession. The size and the shape of the presbyopic segment are matters requiring care and delicacy of judgement on the part of the oculist, whilst questions concerning thinness, cementing, centering, etc., etc., and of adjustment at the very precisely right level, and at the exquisitely proper inclination,—are wholly essential to satisfaction in their use. Until opticians know how to make and adjust them with fine skill and accuracy, it is comparatively useless to advocate their very general use. I have prescribed them in over a hundred cases with less than a half dozen failures.

14. As to pince-nez or eye-glasses, it is the daily bore of my life to keep people with astigmatism or a nasal conformation that renders the use of eye-glasses almost impossible, from wearing such absurd optical instruments. In some obstinate cases I have refused to continue recognizing the person as patient. In many instances an expert optician can adjust an eye-glass so that the axis of astigmatism

is not twisted from the correct angle, or so that the ocular muscles are not put to irritating strain. But vanity too often pays a fearful penalty for its satisfaction.

But, instead of merely clumsily and superficially, perhaps errorfully, touching upon a few of the many important parts of the subject, if I had written the full and scientific treatise that the optician, not the oculist, should long since have produced—there would still remain the pertinent remark that all rules and instructions can help but a very little toward the realization of the ideal. Inherited mechanical capacity, the interested mind, the supple and expert manipulative skill, must learn by experience the lessons that words cannot teach—one of these lessons being that the little things, the veriest details of the optician's handicraft, have direct or remote, but constant significance and influence upon health and happiness.

THE CARE OF SPECTACLES BY THE PATIENT.—I consider it a part of my duty to instruct patients in the details of the care of their delicate little optical instruments. I show them by illustration how to put the glasses on and how to take them off without wrenching the joints, and bending the frame out of adjustment; and without soiling the lenses by banging them against the eye-lashes or lids; and also how to clean the lenses without endangering the lenses, or the form of the frame. I tell them to use only an old clean, unstarched cotton or linen handkerchief or cloth for polishing the lens,—never using the handkerchief used on the face and never using chamois leather, tissue paper, silk, etc. I advise ammoniated rose water for cleansing the lenses. I caution them not to fold the frame up at night, nor lay the lenses upon their face. I put the greatest stress on keeping the frame straight, and instruct each patient how maladjustment may be detected, why it works injury, and make them promise to return to the optician frequently for the correction of possible misplacments of the glasses. If the lenses are prismatic I explain the temporary distortion of objects, and if otherwise of high power I give especial hints as to their use and misuse. In all cases I urge elevation of the book, paper, writing, etc., as near as possible to a level with the eyes, the proper placing of the light, or of the body as regards the light, the wisdom of frequent little rests in protracted reading, etc., etc. Patients need these little bits of advice, the medical results are better, and though constant repetition is somewhat tiresome to oneself, I have found that in the long run it avoids annoyance and trouble.

REMARKS ON EXTRACTION OF CATARACT.

By Peter D. Keyser, M. D.,

PROFESSOR OF OPHTHALMOLOGY, MEDICO-CHIRURGICAL COLLEGE, AND SURGEON TO WILL'S EYE HOSPITAL, PHILADELPHIA, PA.

There is no one method of operation for the extraction of cataract suitable for all cases. Good judgment in selecting the method to be adopted is as necessary as the dexterity in making the operation. The choice of operation must depend upon the character of the cataract, and condition of the eye in all its bearings, which can only be determined by a careful examination. I have never been able to make a great series of operations by one method in which everything turned out just as was wanted and expected. My experience which has been a long, varied and successful one, almost forces me to doubt many of the long listed favorable reports of the hundreds of cases made successively and successfully by one method without change or mishap before or after the delivery of the lens.

For cosmetic purposes the extraction without iridectomy is no doubt the *par excellence* of operations, but it is utterly impossible to do so in every case; and as to acuity of vision obtained, I have found it no better than when iridectomy is made.

Ever since the introduction of de Wecker's flap operation in 1875, I have attempted, more or less, to extract all good ripe cataracts without iridectomy, but cannot say that I have been always successful on account of several complications that have fallen in the way.

The complications mostly found are:

1st. Prolapse of the iris immediately or any time within forty-eight or fifty-two hours after the extraction which cannot always be replaced by eserine, the spatula, or gentle rubbing over the lids.

2d. A rigidity or inactivity of the iris; a sluggishness in action when light is thrown on the eye; pupil dilates slowly and only about one half under the action of a mydriatic. This rigidity is such that instead of the iris dilating to permit the lens to pass through, it more likely contracts and completely prevents the expulsion of the cataract by the ordinary pressure on the ball in the operation.

3d. In cases where the lens is not thoroughly firm, a large amount of soft cortical matter, or an over ripe fluid cataract (morgagni) which cannot be readily removed from the eye; the soft particles passing in under the iris during the pressure in the manipulation to force the lens out. Much of this latter trouble however, is now removed by the washing out of the anterior chamber.

4th. Fluid vitreous. In which case it is necessary to draw the lens out by a traction instrument quickly to prevent, as far as possible,

much loss of the vitreous, as well as the falling back of the lens into the posterior part of the eye.

By experience, I have found that success in extraction without iridectomy is generally to be expected when the cataract is what is called ripe—lens thoroughly opaque and firm—the iris very active on the stimulus of light, and the surroundings of the eye in good condition, with generally good health.

Where there is much soft cortical mass suspected, I have found it best to make iridectomy with the extraction. When the iris is very rigid and sluggish there is invariably a tendency to iritis, and the best practice is to make a free iridectomy some weeks previously to the ex-extraction of the lens. This has been my practice for many years and the success has been very satisfactory.

The method of opening the anterior capsule requires careful consideration so as to prevent, if possible, a fold or piece lying in the pupilary region and requiring a secondary operation, even before there is any special thickening of the posterior capsule. The anterior capsule should be carefully examined, and if thin and in good condition, an incision across the upper part horizontally with a longitudinal one from well down under the iris up to the first—(thus ⊤), I find a very good method, and in this way the side flaps roll out of the pupillary space. The removal of a piece of the capsule by de Wecker's forceps is also very good, especially when an iridectomy has been made. Without iridectomy, care must be taken that the iris is not caught on the teeth of the forceps in the act of withdrawing the instrument from the anterior chamber and thus causing a prolapse as well as injury to the iris. When the capsule is found at first to be thickened, then I think a piece should be removed either by de Wecker's forceps or by my hoe shaped cystotome, as described in the Transactions of the Pennsylvania State Medical Society, 1883.

For the past few years I have washed out the anterior chamber, even from under the iris with great satisfaction. I use de Wecker's small syringe containing a weak solution of boric acid and eserine in cases where no iridectomy is made, and plain boric acid solution where there is an iridectomy.

We have always been taught that an extraction should not be made until the cataract is completely formed or what is called ripe. This idea I have given up long ago and have had as good success in removing unripe cataracts as ripe ones. There are many persons having slow forming cataracts who suffer for want of means and friends to assist them and are placed by the diminution of vision in such a plight that almost drives them to desperation; too blind to work and support themselves and thoroughly helpless except to move about and be a burden to those near and around them. I think it a duty

to assist such sufferers, and I always operate, extracting with iridectomy, and have found them to do well; thus giving them a chance to be useful to themselves as well as to others.

If the posterior capsule becomes thickened forming secondary cataract, any operation thereon should not be undertaken until the the eye is quiet and free from the inflammation of the first operation. The operation for secondary cataract is not such a light affair as is supposed, and to me it has been a very delicate and troublesome question what to do to endanger the eye as little as possible again, for I have had the simple laceration of the capsule to cause the loss of some eyes after beautiful and successful extractions; and in one case the inflammation became so serious as to pass up to the brain and cause death.

Simple laceration is an uncertain operation and at times must be repeated. When the capsule is first torn the vitreous coming forward opens the incision quite wide and the appearance is of a successful operation; but in a short time the presence of the vitreous recedes and in some cases the gap in the cupsule closes causing a renewal of the diminution of vision, and requiring another operation and again placing the eye in jeopardy. If the capsule is in anyway thickened enough to be able to engage it on a small hook I prefer to extract it at once. This latter method is to my mind and experience the best.

I present these few remarks upon this important subject with the knowledge that it is often we learn from the experience of others and that carefully collated statistics of experiences give us something for thought from which we can form good and proper judgement, and I hope these few ideas tersely put together of my practice may be of some benefit to the profession or rather younger members thereof, who desire to gain knowledge from the work of others.

A CONTRIBUTION TO THE STUDY OF CONCUSSION CATARACT.

By Casey A. Wood, C. M., M. D.

PATHOLOGIST TO THE ILLINOIS EYE AND EAR INFIRMARY; PROFESSOR OF OPHTHALMOLOGY, CHICAGO POST-GRADUATE MEDICAL SCHOOL; OCULIST AND AURIST TO THE ALEXIAN HOSPITAL ETC.

It matters not from what standpoint one studies the many varieties of cataract the deep mystery of its pathogenesis seems no nearer an explanation than when in the days of Mackenzie[1] the causation of the senile form was set down as due to defective nutrition of the lens. In spite of observation of this common pathological manifestation made

1Diseases of the Eye. p. 574. London, 1830.

by numerous workers during the past sixty years, it seems as if we cannot say much more than that about the etiology of the cataract of old age.

It is much the same with the traumatic form. "The lens," says Mckenzie,[2] "is rendered opaque by the coagulating influence of the aqueous humor." One might go still further and claim that one of the best English descriptions of the disease in all its phases is still to be read in this same treatise.

Microscopically considered it is, however, a far cry from early guesses at the minute changes in the lens to Becker's exhaustive and beautifully illustrated monograph.[3] And yet *why* the alterations there set forth occur as they do is a question as yet unanswered. These difficulties are not lessened when we consider what seems best termed "concussion cataract." Here neither the minute histological alterations present nor the theory of nutritive disturbance throws much light upon this curious form of lenticular opacity.

Definitions of cataract due to concussion are as a rule loosely given. In most text-books indistinct references are made to the hazy lens resulting from bodily concussion which are generally regarded as of the traumatic form. But a moments consideration will show that cataract due to direct traumatism has not much in common with pure examples of cataract resulting from concussion. For the purpose of contrasting these we may define the latter to consist of those changes in the *normal and normally situated lens or its intact capsule that show themselves shortly after a shock or concussion affecting the bulbus oculi in common with the head or whole body.* Evidence of lenticular dislocation, of a ruptured zonula, of a fissured capsule or of a late appearance of the opacity should be sufficient to put the case out of court. The changes, whatever form they may take, must spring directly from the shaking up of the lenticular or capsular elements. Possibly the lamellar cataract of infancy (as a result of convulsions) may be a sample of this unless the opacity be really a "coagulation effect" upon the lens layers next a minutely fissured capsule due to the entrance of aqueous. The following case, referred to me by Dr. Wittwer of this city, is to my mind a good illustration of cataract from concussion.

D. C., age 38, a perfectly healthy looking man always had good vision in both eyes and has always had good health. None of his relatives were short sighted or had suffered from disease of the eyes. Patient is certain he has never had any disease, acute or chronic, affecting either eye. Vision in left eye $\frac{20}{20}$ and it is in all respects normal. Towards the end of May 1890, patient was "greasing" the axles of a stone truck weighing over 30 cwt. He had raised the side of the truck by means of an ordinary wagon "jack," and had depresssed the long arm of the lever into its proper place when the body of the truck lurched throwing the lever with full force into the air.

2L. c. p. 574.
3Zur Anatomie des gesunden und kranken Linse.

Patient was stooping at the time and received the end of the arm on the upper-outer margin of the orbit cutting through a portion of the lid and other soft tissues to the bone and making a deep, irregular and ragged wound. C. was felled to the ground. He was removed to the Eye and Ear Infirmary where his wounds were dressed by my colleague Dr. Baldwin Wylie. In a week the chemosis had subsided and the wound shortly healed so thoroughly that only a faint cicatrix remained. A slight ptosis resulted. Dr. Wylie reports the following as the intraocular condition. "The vitreous was full of blood and there was also some in the anterior chamber. The a. c. cleared and the inflammatory attack subsided rapidly under hot fomentations, atropine and a laxative. The case was under my care for three weeks during which time I was unable to find any opacity of the lens although I looked carefully for it. I did so because the blood in the anterior chamber seemed to come from behind the iris which led me to suspect a rupture of the zonula and perhaps of the capsule. The vitreous became somewhat clearer, that is to say was less dense, but vision did not amount to much while the patient was under my observation." Some time afterwards the patient tested his vision and found that he could detect handmovements and could discern lamplight and he is positive that his visual acuity remained the same until a second accident more than a year afterwards. August 18th 1891 he was driving a heavily laden coal wagon over a light bridge. The bridge broke and he was carried with horses and wagon into the culvert. Patient was removed unconscious and with a scalp wound 3 inches long in the occipital region. There was no injury whatever about the face. Three days afterwards noticed that the vision in the right eye was markedly worse and that there was some pain over that eye. *Status presens;* R. E. V=p. l. Projection with bright light quite defective. Incomplete ptosis; linear scar 2 cm. long extends from central line of orbit outwards and downwards to lid; pupil immovable, irregular and dilated to 7 mm. No sign of scleral or corneal cicatrices. No tenderness of bulb or congestion of vessels. The iris same color as opposite side. The lens is opaque and bulges equally forward into the shallow anterior chamber. There is no dislocation and no capsular rupture. The lens has the appearance of an ordinary traumatic cataract, with white pearly plates surrounded by transparent substance. Its anterior surface seems to project above the plane of the iris. Friends now remark his right "white eye" when before it was not noticeable and he asks if I cannot remove the blemish. One month after the patient was first seen a careful examination of the eye can detect neither rupture of the capsule nor dislocation of the lens.

But the distant shock may affect the capsule alone or both capsule and lens substance. Becker[1] regards the former result as due to a separation of the capsule from the underlying lens.

W. M., rather a delicate boy, aet. 14, was riding in the rear car of a cable train while the latter was running up grade in a tunnel. A train ahead broke loose and collided with the former. Most of the passengers jumped off the two trains but the boy remained behind with a few others and the car in which he stood was wrecked. Beyond some external bruises he apparently received no other injuries, made his way home without difficulty and said very little about the accident. The next day, however, when questioned he was unable to give more than a confused account of the affair and the family had to obtain a full description of it from other witnesses of the accident. Four days afterwards he complained of headache, dimness of vision and seemed to be feverish. As his eyesight had always been excellent (patient did clerical work in a down town office) the family physician, Dr. C. H. Carter, was called in. Drs. Lee and Murphy saw him shortly afterwards in consultation when a 3 per cent. solution of atropia sulph. was ordered to be instilled into both eyes. I saw him the following evening. The boy was then lying in a busy delirium, unconscious, and with flushed face. Both conjunctivæ were slightly injected and the pupils were widely but irregularly dilated. Minute exudation-tags bound the iris to the lens in several places, a condition of

1 Pathologie und Therapie des Linsensystems. Graefe und Saemisch Bd. V, 275.

things more marked on the left side than on the right. There were some dots of uveal pigment in the medial pupillary field of both eyes. The corneæ were both perfectly clear and there were no traces of injury about the face or head, nor, as Dr. Murphy tells me, about the body anywhere. At both anterior poles are two cataracts which closely resemble ordinary anterior polar opacities and which are mostly confined to the capsule. The left is more diffuse and deeper than the right. The fundus cannot be properly examined owing to the unsteadiness of the patient. Atropine in reduced doses (0.50 per cent. solution) to be continued. Three days subsequently the patient was quite conscious, with less fever etc. In both eyes V=shadows. The anterior polar opacities extend into the substances of both lenses as well marked haziness, more pronounced on the left side than on the right. This lenticular haze is comparable to the opalescent gray tint observed in the eyes of old people but does not extend regularly in any direction. There is a streak of vitreous bleeding in the left eye and the fundus is not so well seen as in the right eye. The synechiæ have all given way but the ciliary and conjunctival hyperæmia is more evident. Patient died on the 10th day. The autopsy, made by Dr. Louis J. Mitchell, revealed what was thought to be a traumatic meningitis. I examined the eyes *in situ et post mortem*. The *right fundus* (with its peculiar post mortem appearance and grayish-white reflex) was well seen. The anterior opacity and the isolated dots of pigment in the right eye showed much as they did at the last examination made during life. It was quite different, however, with the left eye where the reflex was almost dark. Here, whether or not it was due to the whiter background or to an increase of the bleeding I cannot say, but the vitreous hemorrhage appeared to be nearly twice as large as before, while the lens was hazy throughout and at the posterior pole there was also a circumscribed opacity. I was not able, unfortunately, to complete this history by a microscopical report.

This case is almost an exact counterpart of Beckers[1], which I venture to copy.

A railroad employe was cutting icicles from the entrance to a tunnel when a piece of ice fell and hit him in the right ocular reigon. The pain was not very great but as his vision was somewhat disturbed he applied, after some days, at the clinic where with the exception of vision nothing $\frac{20}{50}$ abnormal—neither external wound, nor dislocation of the lens nor capsular tear—was found except rupture of the choroid. The latter was rather central but not large. Patient presented himself from week to week and furnished an opportunity to observe, in the third week, the gradual setting in *of an anterior polar cataract*. This slowly took the same form that one sees in the posterior polar opacity accompanying peripheral injuries to the lens. After it had reached the size of a moderately dilated pupil it remained stationary. Patient passed from observation after a year.

Cataract due to immediate rupture of one or both capsules, to dislocation, or to tearing of the zonula, as well as those opacities showing themselves months after indirect injuries have been styled concussion cataract but I am not disposed to include them in this category. I have elsewhere[2] published a case where rupture of the capsule of both lenses was brought about in apparently healthy eyes by pleuro-pneumonic cough, while similar and equally interesting instances resulting from other forms of concussion are on record, but evidently in these cases contact of the aqueous with the lens mass is the important factor and not the damage to the lens *per se*. In the same way the late cloudiness following dislocation is produced by interference with the nutrition of the lens.

1Graefe u. Saemisch, l. c.
2Montreal Medical Journal, August, 1891.

Very little has been advanced to explain these cases. In Becker's Anatomy the consideration of all forms of traumatic cataract is purposely omitted. All who have written about this matter refer the causation of concussion cataract to one or other of three standard causes: (1) invisible rupture of the capsular integrity; (2) separation of lens and capsule, and (3) interferance with the nutrition of the lens. The first alleged cause may be dismissed as not proved, the second is probably not the cause in those cases of cataract from concussion where the body of the lens substance is affected, while the third cause is admitted to operate so slowly that it cannot explain the early appearance of the opacity.

It seems to me that in cases like that of D. C. (Case 1) we can only explain the appearance of the opacity by supposing such a commotion of the lens substance within the capsule that the molecular arrangement of its epithelial contents had been so disturbed as to actually interfere with the passage of light through them. We have a somewhat crude but, it appears to me, quite relevant illustration of this in the opacity of ground glass, scratched ice, and in the polarization of light in passing through bodies otherwise perfectly transparent.

It may be objected that this is taking a too purely physical view of the matter but, after all, it is chiefly in its *fibre-arrangement*, or rather perhaps in the relation which this arrangement bears to the air spaces, fat cells (or other intra-cellular collections) and watery globules that varieties of the cataractous differ from the transparent lens. It is rather from the arrangement of these differing refractive media than from their inherent opacity that cataract results.

As DeWecker* points out, the claim for cataract arising "*d'une simple commotion du cristalline*" rests also upon "*les essais de maturation qu'on a enterpris dans ces dernier temps* [*et elles*] *plaident absolument en faveur de pareille production.*" Admitting that Förster's operation acts by destroying the intimate union existing between the lens and its anterior capsule why should the opacity spread to the deeper portions of the latter unless we suppose that the relation of the fibrillæ to one another have undergone change?

Finally one may claim the right to speculate about the physics of concussion cataract until a careful microscopical examination of one of these rare forms of disease shall have set the matter at rest.

*Manuel d'ophthalmologie, p. 489.

THE JAPANESE HOT BOX THE BEST MEANS OF APPLYING DRY HEAT FOR THE RELIEF OF EYE INFLAMMATIONS.

By Julian J. Chisolm, M. D.

Baltimore, Md.

From the earliest times heat has been recognized as a soothing agent for painful surfaces. To bathe a suffering joint in hot water and expect relief by so doing, comes apparently from intuition; hence we are not surprised to find Hot Springs noted to health resorts from the earliest historic periods. In the relief of eye pain heat has long been recognized as a valuable factor. Hippocrates to whom we owe so much in all the departments of medicine 2300 years ago instructed his followers how to apply heat to inflamed eyes; and we all use his methods. Hot wet cloths, soft sponges squeezed from hot water and covered with a woolen cloth prevent too ready escape of the beat; folds of cloth warmed by the stove, small bags filled with hot salt as a warm application. These methods were in daily use in ancient Greece as they are to-day in all civilized countries. They are local remedies of undoubted value.

How to keep up the heat of a uniform temperature for any length of time necessitates unremitting labor on the part of attendants. A hot cloth wet or dry soon gets cold, and has to be renewed continually to obtain the good results which we expect from heat when applied to an inflammed part. Experience teaches us that a painful eye will stand as much heat as the fingers will bear. In the application of hot wet cloths this rule is our guide. When judiciously carried out the fingers of the nurse are severely tried by the constant dipping into the hot water. Hot poultices for eye disease although very popular with the community are very unsatisfactory to the profession. To be useful they must be thick enough to retain heat. This makes them heavy and very uncomfortable.

Two years since when visited by a medical friend from Japan my attention was called to a small flat hot box which he told me was in universal use in that country as a pain killer. The box was a little smaller than the hand in length breadth and thickness. It was slightly curved in shape as is the hand when it begins to close so that the concavity can apply well to the rotund parts of the body. The box was made of very thin sheet copper or tin, perforated with a few small holes to allow of the admission of air. Over the top was a sliding lid fitting accurately into the groove. The metal box was covered with colored muslin. The heating power was a cartridge, resembling a large Chinese shooting cracker. It was made of powdered charcoal firing

wrapped in paper. It was about 4 inches long, as large in circumferance as the index finger and would burn under slow combustion for nearly three hours. One of these charcoal packages when lighted and closed up in the box would burn slowly owing to the small amount of air admitted through the perforations in the metal and would keep up a temperature about 120° Fahrenheit. The metal was so thin that the box had but little weight. These pain releaving boxes are to be found in every home in Japan and are in universal use for the relief of pain where ever located.

Hot cloths are so soothing in the relief of eye pains that I determined to experiment with this hot box from Japan. Its size made it a little awkward for eye work but I found it nevertheless very efficient. It is now one of my most trusted agents for the relief of pain in many eye diseases such as iritis, sclerities, corneal ulcers and glaucoma. My method of application is as follows: After inserting the lighted fuse and the box has become warm I envelop the box in the folds of a handkerchief and by the ends of the handkerchief secure it to the head. A little loose cotton applied over the closed eye fills up the socket and allows the heat to be transmitted directly to the painful organ. The handkerchief protects the face from the edges of the hot box. Once applied it needs no renewal for two or three hours.

In many cases the relief of pain is magical. In old persons I have avoided the necessity of removing painful eyes lost by glaucoma by the use of this hot box. Previous to its application the disease had resisted both iridectomy and medication local and general.

The Japanese hot boxes and cartridges can be found at all Japanese stores and are also kept by many druggists. They commend themselves for their convenience, simplicity, economy, cleanliness and efficiency as an application for the relief of pain. I find in them the most valuable method of applying dry heat as a remedial agent.

114 W. Franklin, St., Baltimore, Md.

A NOTE ON HYOSCYAMINE AS A MYDRIATIC.*

By S. D. Risley, M. D.,

ATTENDING SURGEON WILL'S EYE HOSPITAL, PHILADELPHIA.—LECTURER ON OPHTHALMOLOGY, UNIVERSITY OF PENNSYLVANIA.—PROFESSOR OF OPHTHALMOLOGY IN THE PHILADELPHIA POLYCLINIC AND COLLEGE FOR GRADUATES IN MEDICINE.

In the issue of the Philadelphia *Medical Times* for February, 1881, I published a preliminary statement on the "Employment of the Sulphate of Hyoscyamine for Paralyzing the Accommodation;" and in July of the same year, presented a paper on the "Comparative value of the Mydriatics" in which a more extended study was made.

*Read before the Am. Opthal. Soc., at Washington, D. C., Sept. 1891.

The conclusions in this paper were based upon ninety cases in which the hyoscyamine salt had been used and careful records made of its effect on the pupil and ciliary muscle and the results carefully compared with those attending upon the like employment of the sulphate of atropine and duboisine, and the hydrobromate of homatropine.[2]

The preparation used was a white crystalline salt and when placed in solution was entirely bland, causing no irritation when instilled into the conjunctival sac. The salt proved so much superior to the other members of the group when employed in those cases of refractive error, accompanied by retino-choroidal irritation, and asthenopia that during the intervening years, I have employed it in my private practice, to the exclusion of the other mydriatics, except in selected cases, the ground of selection being the absence of any marked tendency to ciliary cramp, or where the eye-ground was in a fairly healthy state and headache not a marked symptom. After ten years of additional experience in its daily use, I have not found occasion to materially change the conclusions then formulated. The object in the present note is to call attention, not so much to its great efficiency as a mydriatic, as to point out the cause of certain irregularities in its action. In the paper already quoted, the fact that certain preparations of the drug, even then in the market, were not trustworthy was foreshadowed in a single case there reported, in which the returning accommodation had pursued the same course as though the sulphate of atropine had been used. The dispensing druggist was consulted regarding the variation and exhibited the bottle from which the drug had been dispensed. It bore the label of Merck's laboratory and contained an amorphous, semi-fluid brownish mass, instead of the crystalline salt, with the action of which I was familiar and upon which the original observations were based. The investigation was not pressed further at that time, but care was taken subsequently to procure only the crystalline salt. Of late as the hyoscyamine has come more and more into use, I have experienced more frequent inconvenience from the dispensing of inferior preperations. Not only was considerable annoyance experienced by the returning accommodation being delayed beyond the normal time for hyoscyamine, but very frequently the solutions furnished caused severe and protracted smarting when instilled, in some instances so violent as to preclude a second application. When this occurred I found that the amorphous salt had been used in every instance where I found it possible to consult the druggist who had prepared the solution. I called the attention of Mr. Frank Morgan, of Philadelphia, to these facts and requested him to inform me as to the chemical history of the drug. In reply he placed in my hands a mass of literature on the

2 Vide, Trans. Am. Oph. Soc. 1881.

alkaloids of the Solanaceæ and a carefully condensed statement which he had prepared. From these sources, the following facts, sufficient for my present purpose, were gleaned, and which I desire to present as a preliminary statement to a more detailed study of the physiological properties of these alkaloids when employed as mydriatics.

I am encouraged to make this brief statement since it seems to furnish a sufficient explanation of the irregularities observed.

In the first place the mydriatic alkaloids extracted from the solanaceæ are very complex, chemically considered and when subjected to appropriate manipulation yield a group differing more or less widely in their physiological action although obtained from a common source. It would seem furthermore that the method of extraction employed determines whether the product shall be atropine or hyoscyamine. As found in the market the alkaloids may be placed in two classes, (vide Merck's Bulletins) the first of which would properly include those with a simple or homogeneous base, and having a common formula—C_{17} H_{23} NO_3—*i. e.* isomeric. To this class would belong atropine, crystalline hyoscyamine, and hyoscine. In the *second class* would be included those having mixed bases comprising the simple alkaloids of the first class, as they are found mixed in the plants of the natural order of the Solanaceæ, *i. e.*, the Atropa Belladonna, Duboisia Myoporoides, Datura Stramonium, Scopolia Japonica, etc. To this class belong the commercial Daturine Duboisine, Amorphous Hyoscyamine and Scopolein.

From this it appears that, if the simple isomeric alkaloids do in fact possess different physiological properties, and therefore different fields of usefulness as therapeutic agents, in order to secure this advantage from their employment in the daily routine of professional life, only the pure or carefully separated alkaloids or their salts should be dispensed. Since, in using the mixed bases we could expect only to secure an effect which would be the resultant of their combined properties. In addition to these considerations it has been shown by these chemical investigations that these simple bases are liable to conversion under certain methods of treatment. The literature of the subject is extensive, and confused, largely, in all probability, in consequence of ignorance of this possibility of conversion. The discovery of the alkaloid hyoscyamine was first announced by Brandes in 1820 but it was not successfully separated until 1833 by Geiger and Hesse, and later exhaustive studies were made by Ladenburg, 1879-1884 and by W. Will in 1888. The latter in a paper read before the Berlin Chemical Society in 1888, which was subsequently translated for the Pharmaceutical Journal and Transactions for Aug. 1888. Hyoscyamine has been found in Hyoscyamus Niger, Atropa Belladonna, Dutara, Stramonium, Duboisia Myoporoides and Anisodas Landus. It is isomeric

with Atropine and Duboisine, and is therefore very closely related to the other mydriatics of the solanaceæ. Indeed W. Will has shown that when appropriate chemical manipulation is employed *hyoscyamine alone* can be gotten from Belladonna, which can then be converted into atropine by simply heating it to its melting point, or by treating it with an alkali, or by heat in the presence of hydrochloric-acid. One gram of hyoscyamine in 10 per cent. solution was completely converted into atropine by one drop of soda solution in two hours. As an illustration of the confusion which obtains in the study of these products of the solanaceæ it was claimed that at certain seasons only hyoscyamine could be obtained from Belladonna, and at other seasons only atropine, but the later studies of Will renders it probable that this variation was due to the methods employed in their extraction. From this it is obvious that only by great skill in manufacture and purification can a true hyoscyamine be obtained, and as a mydriatic at least none should be employed but the pure and perfectly crystallized salt. The painful irritation following the instillation of solutions prepared from other preparations—*e. g.* the amorphous mass, is due to the presence of impurities, either resin, coloring matter, or possibly Tropine or Tropic-acid; while the irregularity in the duration of the paralysis of the accommodation, and dilitation of the pupil was due to presence of atropine or possibly daturine in the mixed basic salt, a fact as regards atropia readily accounted for in the light of Will's investigations, by the method of preparation directed in our dispensatory, in which soda is freely employed, and the hyoscyamine therefore converted, wholly or in part into atropine.

Although these alkaloids are isomeric it is interesting to note that while hyoscyamine has the power of rotating a beam of light to the left, atropine possesses no polarizing power.

We therefore conclude—

First. That for ophthalmological purposes only the pure crystals of hyoscyamine skillfully prepared should be employed.

Second. That in dispensing it the solution should be strictly neutral, that only moderate degrees of heat, if any should be used, and when filtered this should be done through neutral paper.

1722 Walnut Street.

THE TREATMENT OF TRACHOMA.

By Jno. Herbert Claiborne.

new york.

Much has been written recently concerning the treatment of trachoma by the so-called method of expression, and many surgeons have placed the hall-mark of their inventive genius upon forceps by means

of which the granulations occurring in this disease are crushed and destroyed. Others have been content to rely upon their thumb-nails to attain the same end. It is a striking fact that few have pointed out with sufficient clearness the indications for the employment of this treatment.

That the treatment of trachoma by expression should not be addopted in all cases must be clear to anyone who is familiar with all its phases. That it should be used in those cases where there is something to express seems a reasonable proposition. If this method of treatment is to be used, it should clearly be restricked to that stage of the disease when the granulations are large and numerous and stand separate or are coalesced in folds. In this stage the process is subacute or chronic and the eye has lost the sensitiveness which is so characteristic of it in the acute condition.

This method of treatment has been used quite widely in this country and flattering results have been reported. Indeed it has been claimed that cases have been cured in a remarkably short time, reckoned in weeks instead of in months. It would be interesting to know the subsequent history of these rapid cures and perhaps the master of some other clinic might throw valuable light upon them if he only learns their antecedent history. The method is of course known and has been referred to by foreign writers but it has not attained any such popularity in Europe as it has in America.

If this method of treatment is to be employed in the name of humanity let it be employed under the influence of a general anæsthetic. If one is to judge from the mildest of astringents to the employment of the actual cautery and absolute expression, we can read the history of therapeutic fashion. The persistence and tenacity of this disease is something well known. I have however heard a German surgeon remark that he cured all the cases of trachoma that came under his observation with a 2 per cent solution of nitrate of silver. A sojourn in the metropolis of this country and some experience with Heberman trachoma would modify his opinion and widen his experience. Up to the present date the sulphate of copper applied in the form of the solid stick seems to have held its own better than any other form of treatment and has given on the whole the best and most permanent results. At least six months, however are necessary for a complete cure in a severe case by this method and this tardiness has been the excuse for many of the substitutes that have been tried as short roads to reach the same end. I cannot refrain from expressing myself by the outcries of the patient and the incontinent way in which he makes his escape after the employment of this treatment under cocaine, the method is both barbarous and inefficient; barbarous, because it subjects the patient to unnecessary pain; inefficient, because it induces him to bear the ills he has rather than to subject himself

again to such treatment. I have yet to see a patient who would return for the second expression without general anæsthesia.

It fulfills the indications of a classical treatment for a patient to be cured, quickly, safely and happily. If expression can be shown by the majority of intelligent experience to fulfill these demands, we shall have a classical method of treatment. But no man need be a patriarch in ophthalmology to have lived through several eras of treatment of trachoma.

Instead of expression in those cases of trachoma in which the first spawn granulations exist, I am accustomed to use the actual cautery and I prefer the platinum probe heated over a spirit lamp to the more severe and long continued heat of the galvano-cautery or Paquelin's cautery.

The time at which this method is employed is an important factor in the treatment. It should only be employed, I am convinced, after all the acute febrile symptoms and signs in the lids have disappeared. To use it in the acute stage of trachoma when there is profuse lachrymation and secretions is an error. At first ice cold applications by linen pledgets and ice water lavage should be used. A salve should be prescribed for constant use on the edges of the lids to prevent the secretion from excoriating the lid and cheek and an occasional drop of a 4 per cent. solution of cocaine may be instilled to ease the discomfort. The cocaine should be discontinued as soon as the acute symptoms subside. The frequency with which the cautery can be applied depends upon several factors; the morale of the patient and the resistance of the eye. Some patients will admit of an extensive application of the cautery every two days for several applications in succession. Others permit of it once a week or more infrequently.

The restrictions I believe are chiefly morale ones, for, according to my experience the eye recovers from the attack in twenty-four hours, if ice applications be made with efficency immediately afterward. I have not found it necessary to use cocaine in dispensary and hospital patients. They have frequently told me they suffered no pain even when cocaine has not been used. There is a mild explosion when the ball of the probe is laid upon one of the granulations; this causes a slight start in the patient when he is unused to the treatment, but I have never observed any other indication of discomfort in patients during this treatment as long as the probe is applied to the granulations, nevertheless, I consider it a good precaution to use cocaine. I think the probe should be applied to each granulation separately and that it should *not* be drawn along the conjunctival surface. By the non-observance of this rule I am sure unpleasant results have been obtained —viz: the causation of cicatricial contraction in the mucous membrane of the lid. This I am aware, has been said to be one of the unpleasant

results from the use of the actual cautery in the treatment of trachoma. I feel certain that this result will not occur if the above directions be observed. The severe test of the thermo-cautery and the electro-cautery distinctly conduce to the formation of cicatricial contractions of the lid on account of the destruction which they cause in the tissue that lies underneath the granulations. The extent or area which may be cauterized at each sitting can best be determined by the surgeon in each case. After the cautery has been properly applied a sufficient number of times, the granular masses will be found to be destroyed to a level with the surrounding tissue and then the advantage that has been gained by the cautery has to be held by the daily use of the stick of blue stone. This seems to be the one remedy that has successfully stood the test of time and experience and while it has never accomplished brilliant results it is to-day in all probability recognized universally as a safe slow and sure means of curing trachoma. With the combined action of the actual cautery and the blue stone I question whether many cases of trachoma are cured under six months of treatment. This is perhaps an average duration of trachoma under the treatment of blue stone alone; yet the relief which is experienced by the patients from the destruction of the granulations warrants the use of the cautery.

The summing up of the above would be the following: relieve the acute stage by ice applications and mild antiseptic washes; when the granulations are exuberant destroy them at proper stated intervals by the actual cautery. Continue this till the granulations are burned down to the level of the surrounding tissue; hold the advantage thus gained by daily applications of the stick of blue stone.

HOW TO TREAT SIMPLE CONJUNCTIVITIS AND PURULENT OPHTHALMIA.

By Henry L. Wolfner, M. D.

CHIEF OF CLINIC MO. MED. COLL. OCULIST TO SOUTH SIDE DISPENSARY, ETC., ST. LOUIS, MO.

The method of treating acute conjunctivitis of which I wish to write is not new, as Dr. C. E. Michel read a paper on this subject before the Missouri State Medical Association.

In April 1887 I presented a paper on the same subject to the Medico-Chirurgical Society of St. Louis and a few weeks later the subject was brought up before the St. Louis Medical Society. The discussion that the paper provoked at that time warrants me in bringing it again to the notice of the profession.

There is no doubt in my mind that the present mode of treating acute conjunctival inflammations is barbarous and should be discontinued. The patients are made to suffer, in some cases agonies and

the duration of the disease prolonged. The cause of chronic conjunctival troubles can frequently be traced to the prevalent method of treatment.

The latest books recommend:

Nettleship (edition 1887) page 109. Speaking of catarrhal ophthalmia says: "Any mild antiseptic lotion will cut it short, nitrate of silver (gr. i-ii to ℥j) being best." And of purulent ophthalmia p. 104: "The essential measures are—(1.) Frequent removal of the discharge by the free use of weak antiseptic or astringent lotions (F 3, 19, 20, 23, 28, 29). Every hour, day and night, the lids are gently opened and the discharge removed with soft bits of moistened rag or cotton wool; or a syringe or irrigation apparatus.....may be used.....Many surgeons greatly prefer weak nitrate of silver (F3) to all other remedies. Strong solutions of nitrate of silver, or the mitigated solid nitrate (F1 and 2) are of great service in shortening the attack and lessening the risks, and, whatever other treatment be adopted, they should be used in all severe cases unless specially contra-indicated. A ten or twenty grain solution is brushed freely over the conjunctiva of the lids, everted as well as possible, and freed from discharge. If the mitigated stick is used more care is needed; and to prevent too great an effect, it is to be washed off with water, after waiting about fifteen seconds," &c.

Geo. A. Berry in the treatment of acute conjunctivitis advises the following, page 31: "The local treatment should consist in the frequent bathing of the eyes with some weak non-irritating antiseptic lotion, such as boracic acid (1-50), or corrosive sublimate (1-5,000 or 1-10,000).....When there is much discharge, nitrate of silver in solution (5-10 grains to ℥j) should be applied to the everted lids once daily or every second day.....No other astringents should be used during the acute stage, as they only tend to keep up the inflammation and make it chronic." In purulent ophthalmia he recommends to begin with ice compresses frequently changed and frequent washings with sublimate solution 1-5000. "As soon as the upper lid can be everted without too great difficulty an application of a solution of nitrate of silver (5-10 gr. to ℥j not stronger) should be made once or twice during the twenty-four hours, with the object of restraining the discharge and diminishing the risk of subsequent inoculation of the cornea," &c.

Specimens of this sort could be multiplied by the dozen, but from these it will be seen that the habit of using astringents, antiseptics and germicides for the cure of acute and purulent conjunctivitis is almost universal.

There certainly must be some reason for the general use of the agents named and I have tried my best to find one better than "my patients get well under this treatment," and this is no reason at all.

We all know that formerly typhoid fever patients were bled daily and that some of the old practitioners had excellent results from this line of treatment. Patients were constantly salivated to cure peritonitis. Toothache was a positive indication for the extraction of a tooth. Although statistics show that in spite of the bleeding, typhoid fever patients got well; that peritonitis was relieved in spite of the salivation and tremendous doses of mercury; that the patient certainly recovered from his toothache when the tooth was lifted out of his head, still no one would consider it good practice to-day, to bleed for typhoid, salivate for peritonitis, or extract a tooth for a slight pain.

From all the foregoing I simply want to show that the mere fact, that patients recover while being treated according to a certain method, is not proof positive that the agent employed really cured or assisted in the cure of the disease.

Simple conjunctivitis is not a serious trouble, it is a catarrhal inflammation of the conjunctiva and in the majority of cases the annoyance to the patient is so slight, that he will not consult a physician. The layman says "he has a cold in his eye" and that a few applications of raw beef, scraped potatoes or cold tea leaves to the lids will relieve him in a few days and he is rarely disappointed. The cases that do not yield to the cooling applications, are those in which the general health of the patient is below par, or he is compelled to use his eyes during the attack; or what happens much oftener he has an ametropia which keeps up the irritation. Then there are certain cases the result of irritating fumes or dust, which cannot get well as long as the patient continues to be exposed to their influence.

In the present state of our knowledge it will probably be thought, that I am going entirely too far, when I say that I think that all conjunctival inflammations, except those caused by direct chemical or mechanical irritation, are the result of microbic infection, and it will not be long before the specific organism for each variety of conjunctival inflammation, will be recognized. Cold or climatic changes may have a certain influence on the vitality of the tissues and their ability to resist infection, but the exciting cause is always a germ. This statement is made to show that I believe in the germ theory, although I do not believe in the use of germicides in acute conjunctivitis. Most ophthalmologists that believe in the germ theory, use antiseptics and germicides in the treatment of conjunctivitis and those who do not, pin their faith on astringents.

The main objection to the use of these agents, is the irritation and consequent congestion that they cause. The cornea is so sensitive that a breath of cold air causes discomfort and a drop of cold water will not only give rise to a stinging sensation, but sometimes great pain. Any germicide or astringent solution will certainly irritate more than cold

water and it is really on account of the irritating property of astringents solutions, that they are used in the treatment of conjunctivitis. The weak solution of astringents which is generally prescribed for conjunctivitis can certainly have only an exceedingly slight astringent effect, but they can irritate. The experiment of pricking, or irritating by other means, the mesentery of a frog, will show very clearly the effect of astringents and germicides on the conjunctiva. If the mesentery be pricked with a pin, or a drop of astringent solution be placed upon it, there will, almost immediately, be noticed a contraction of the bloodvessels, so that the tissues appear blanched; but after a short time reaction takes place and the vessels become very much larger than they were before. Astringents in the conjunctival sac will bring about the same result. There is no doubt but that the immediate effect is a constringing of the vessels, but the conjunctiva will in a short time be as red as it was before the application. Everyone will admit that an application, of even the mildest collyrium, will produce a slight irritation and *ubi irritatio, ibi fluxus est.*

But there is no doubt that patients treated after this fashion *do* get well and the explanation of apparent paradox is very simple. The astringent applications irritate the conjunctiva and cornea and in consequence there is a greater flow of blood to the parts; the increased blood supply brings about an hypertrophy of the epithelium and in this manner the parts are protected and the irritants can do no more harm.

The skin covering the palm of a lady's hand is very delicate and sensitive. If she attempts to row for an hour, she will find her hands red and blistered; but if she persists in rowing every day and bringing about this intermittent irritation and congestion, in a short time the epithelium becomes hypertrophied, the delicate nerve filaments are buried and protected and she can row all day without experiencing any great discomfort. The conjunctiva is a mucous membrane and but a modified skin and therefore subject to the same changes.

A slight catarrhal inflammation of no other mucous membrane would be treated after the usual manner of *attacking* acute conjunctivitis. A slight coryza is not treated by injecting a vast amount of a solution of sulphate of zinc or alum into the nose. The patient is told to leave his nose severely alone, but to take a hot foot-bath and to drink hot lemonade on going to bed and in the morning he generally finds himself much better. This same treatment I would recommend for acute conjunctivitis and would only add a cooling lotion to be applied over the closed lids. A solution of boric acid or plumbi acetat and opium in water usually answers the purpose very well. Cold applied to the lids will act to a certain extent, as an astringent without causing appreciable, if any, irritation; at the same time if the disease is

really due to a micro-organism it will hinder it in its growth.

Ophthalmia neonatorum and gonorrhœal ophthalmia are both acute conjunctival inflammations. Of course very much more violent and virulent than catarrhal conjunctivitis, and accompanied by a profuse discharge of pus.

It is the custom in these diseases to use solutions of nitrate of silver in varying proportions to subdue the inflammation and kill the gonococcus, which is almost invariably present. A weak solution of the same agent, is used in many lying-in hospitals as a prophylactic and with markedly good results. The question is, is the weak solution of nitrate of silver responsible for the phenomenal immunity which these institutions enjoy? There is no doubt that the silver is death to the gonococcus, but the same immunity is enjoyed by other institutions using distilled water. The effect of the instillations is therefore beneficial on account of the cleanliness which it enjoins. In all vert expersentations, and these constitute the majority of all presentations, the child cannot open its eyes from the time the head enters the vagina, until it leaves it. There is therefore no danger of infection until the child is born and even then it would not occur if the accoucheur took proper precautions to prevent it. The precautions necessary to prevent infection, are the thorough washing of the hands and face of the infant, immediately after birth. It is the habit of most children to dig their fists into their eyes, and if the hands and eyelids were clean, they could not rub the vaginal secretion containing the gonococcus into the conjunctival sac. If the washings are thoroughly done, there will be no need of prophylactic collyria.

Credés method is used because it is supposed that some gonococci have found their way to the conjunctiva. If this weak solution of nitrate of silver really destroys the gonococci in the conjunctival sac, and thus aborts the infection, it would be just as rational to allow a patient with gonorrhœa to be careless with the discharge from his penis, if he will only instill a few drops, of a 2 per cent. nitrate of silver solution, between his eyelids occasionally.

Like acute catarrhal conjunctivitis, purulent ophthalmia is a self-limiting disease, provided the patient is in good health; otherwise the disease will last indefinitely. We all frequently see cases in which the disease has run its course and the patient has recovered, although often with loss of a cornea, where no treatment was instituted at all.

If the conjunctiva is irritable in simple conjunctivitis, how much more must it be in these purulent affections. It is therefore wrong to irritate it still more by using nitrate of silver or any other medicament on the conjunctiva.

These maladies should be treated like acute inflammations anywhere else, by soothing cooling lotions; and the mixture advised for simple

conjunctivitis will do very well. The solution should be applied cold on thin compresses and renewed frequently for fifteen minutes during each hour, day and night. Just after the removal of the compress, vaseline or any bland unguent should be applied to the lid margins to prevent their becoming glued together. This is very important as the pus will not cause much irritation if allowed to escape freely; but if pent up it not only causes damage by pressure but it under-goes decomposition and infects the cornea, where the epithelium has become abraded thereby causing ulceration. Ulceration of the cornea when not due to injury caused by the syringe point in washing the conjunctiva is frequently due to infection of the bacteria which bring about the decomposition of pus.

I object very much to a practice which is very common and that is, the constant application of cloths wrung out of iced water. The application certainly retards the development of the micro-organisms, but lowers the vitality of the tissues so that they can not throw off or resist even the bacteria made sluggish by the cold. This has been demonstrated in the treatment of wounds. Too strong solutions of germicides have the same effect. The surgeons seldom use a solution of corrosive sublimate stronger than 1:2000 although 1:1000 would more likely kill bacteria; but they have found from experience that if any germs escape being killed they will develop very rapidly in the tissues which have been robbed from their vitality by the strong bichloride solution. Cold is an excellent remedy but it must not be too severe and must be used intermittently to allow the tissues to recover from the shock.

There is still another point which must be insisted on and that is absolute cleanliness. This is procured by pulling the lids apart with two fingers, one placed over the brow the other on the cheek, to prevent pressure on the eyeball and wiping off with a soft clean cloth or piece of cotton-wool any pus that will escape. It is not necessary to wash out the conjunctival sac, but the nurse is instructed to at once remove all pus that escapes between the lids.

My connection with the clinic of the Missouri Medical College clinic during the last seven years, has given me the opportunity of treating a great number of these cases and my success has been phenomenal. I am almost afraid to state that out of about 200 cases of purulent ophthalmia treated during this period, I have had ulceration occur in only *one* instance and that in a case of gonorrhœal ophthalmia in a man whose constitutional condition was certainly far from normal. We have had very many cases come to us in which ulcers have already formed; but we have generally had the pleasure of seeing the ulceration heal rapidly when this same line of treatment was carried out.

2236 Washington Ave., St. Louis.

SUDDEN ATTACKS OF DIPLOPIA.

By Dr. George T. Stevens,
NEW YORK.

While seeking recently, among hills and streams, the summer relaxation so welcome to the denizen of a large town, diverting myself in dragging from the bottoms of rivers rare aquatic plants or searching for choice specimens in their only homes on the summits of lofty hills, forgetting all the perplexities of professional practice and all questions in ophthalmology in the attractive pursuits of natural science, came, forwarded from home and by the same mail, three letters which are responsible for this brief paper.

Opening the first, was found a request for a contribution to the new ophthalmological journal. How was one who was thus cut off from his base of supplies, so far as ophthalmological material was concerned, to furnish the desired contribution? While pondering this question I absent mindedly opened the second letter. Gazing abstractedly at it for a moment my attention was at length engaged, for there was a gleam of a suggestion that it contained a solution of the problem presented by the first. The suggestion was reinforced when on opening the third letter it was found to be in some sort a repetition of the second.

Here is the gist of what they contained.

In letter number two, an ophthalmologist of not a little experience wrote for advice concerning a case which, he stated, presented features quite new to him. His patient had V. $\frac{10}{10}$, with a positive cylinder of 0.50 D for the right and 1.00 D for the left eye.

"Patient had never used correcting glasses for distance and has "had reading glasses improperly fitted. The feature of interest is in "connection with the recti muscles. For several weeks there has "existed vertical diplopia for near and far points. I find hypertropia "12 degrees. A prism 8° or 10° will unite images for a few seconds, "then the deviation recurs." Without a direct statement to that effect, I was led to believe that the Doctor had found no paralysis of either of the eye muscles, and the letter concluded, "Would you advise operation or shall I wait a few weeks and observe results?"

The third letter was rather more definite in its data. The patient, concerning whose case inquiry was made, had, several months before the present condition of affairs arose, consulted the Doctor, who found a moderate hyperopia of slightly different grades in the two eyes, and a moderate degree of esophoria. Glasses for the correction of the hyperopia were given, as were also reading glasses, the patient being 55 years of age. In June last, the patient again consulted the oculist, now complaining of diplopia in the horizontal plane, the right image

being on the right side and, when the head was erect, at the same height with the other. A prism of 8° would unite the images but would not maintain single vision. The Doctor could discover no evidence of paralysis of the externus of either eye, each eye being able to rotate outward freely and apparently to the same extent. Ophthalmoscopic examination showed no indication of disease and the patient was, except from annoyance of the diplopia, in his usual health, which, without any well defined complaint, was not very good. Like the writer of the other letter, the Doctor desired advice respecting the treatment of his case.

Cases of suddenly occurring diplopia without distinct evidence of paralysis of any of the ocular muscles, while not common, are occasionally met with and are always of much interest. Such cases may be the result of simple exhaustion of muscles on which too great a demand is made in the correction of inherited heterophoria, or they may be premonitions or accompaniments of cerebral or spinal disease. The affection is most probably the full manifestation or possibly an exageration of an original defect, revealed by the fact that owing to fatigue of the muscles called upon to correct the natural defect, or to an enfeebled nervous impulse due to a pathological condition of one or other of the great nervous centers, the two eyes, each of which moving separately, is able to perform all the rotations demanded in health, are still unable to perform the duty to which they have long been accustomed, of overcoming an original defect in the balancing of the adjustment.

In illustration, I will give the notes of two cases reserving comment on each until both are presented.

Case 1.—Mr. C. G. consulted me January 13, 1888, on account of diplopia which had suddenly developed. The patient was a man of fine physique, 45 years of age, and a merchant, a man of good habits and in apparent health except the double vision.

As a boy the patient had been subject to severe and frequently returning attacks of migraine and to tormenting dyspepsia. Otherwise he had been usually in good health. Eighteen years previous to this present attack he had, after an illness from typhoid fever, experienced double vision, from which he recovered after a short time. Patient now says that he is unusually weak and nervous, and that during the past two years he has been losing energy and ambition. On rising yesterday morning he discovered the double images, one of which was nearly in a vertical line from the other.

Vision, $\frac{20}{20}$ each with Cyl.+1.50 D.; reads with cylinder and Sph.+1.25 D.

There was R. hypertropia 8°, esotropia 3°. Both images were erect and remained in very much the same relative position when the eyes were directed in different ways. So far as it could be determined by causing the patient to look upwards, there was no paresis of the right superior rectus, nor was any restriction to be observed in the movement downward of the left eye. Ophthalmoscopic examination revealed no disease of the fundus. By means of prisms 3° each, base down right, base up left, the patient could in some measure control the diplopia although it was not fully corrected. Such glasses were given him and he was advised to use sulph. strychnin gr. $\frac{1}{30}$ three times daily.

Jan. 18th, the diplopia remains and the glasses do not correct it. They

were made to correct 7° hypertropia when he found them much more helpful.

Two days later, Jan. 20th, when he awoke in the morning he was delighted to find that he could unite the images without the help of glasses. He then manifested hyperphoria 2° only. On the following day hyperphoria 2° and a month later 2° R. hyperphoria remained. The use of the strychnine was then discontinued. In September following he suffered much from neuralgia and from buzzing sounds. Examination of the ears did not reveal any condition to account for the sounds.

In November he had hemorrhage beneath the conjunctiva of the left eye, over insertion of inferior rectus. The patient was not seen again but during the following spring he died after a brief illness from what, I have been informed, was thought to be some cerebral affection.

A brother, who was, like the patient, apparently a robust man had died from convulsions, after an illness of only a few days, a few months before.

CASE II.—While this case is apparently, if not really in the nature of partial paralysis, it is still not out of place in this connection.

I first saw Mr. J. W. I. in March, 1887. He then complained that objects at which he looked were dim and grew "dark" as he looked. He could only see by the best light and even when the type was strongly illuminated it soon became confused. He said that when he walked in a moderate or feeble light he was accustomed to holding out his hands in front of him as a guide against stumbling over furniture or other objects. In walking, he had a constant feeling of going down. His gait was stiff and rather jerky which he said was not different from that to which he had been accustomed for many years. For a good many years he had been subject to vertigo, attacks of which were of very frequent occurrence, and he often lost the course of his own thoughts, especially if he were conversing. This mental confusion was a source of much annoyance to him. He was subject to some headache, but not much. While not feeling, as he forcibly expressed it, "bang up well," he was, on the whole in fair health. No dyspepsia, insomnia, pains or aches.

Examination showed V. right eye, $\frac{20}{30}$ with sph.+0.75 D , left eye, $\frac{20}{40}$ with the same glass. R. hyperphoria 2°, esoph. 0°, exoph. 0°, exoph. in A. 6°, abd. 7°, adduct. 35°.

Directed sph.+0.75 D. each, with prism 1° each for R. hyp., for distance and for reading, sph. 3.00 D. with prism as above.

Nearly four years passed between the first and second visits of the patient. He reported that after getting his glasses, he had experienced marked relief from his vertigo as well as from his confusion of vision. He had however lost his distance glasses and got other reading glasses. On the occasion of this later visit he complained of double vision. There was homonymous diplopia, the image of the right eye being 2° lower than that of the left, and this deviation increasing slightly as he looked up until, when looking upward about 10° there was from 5° to 8° R. hypertropia.

The images were erect in the direct horizontal plane, that of the right tilting slightly in looking up.

There was found restriction of temporal rotation of right eye, to the extent that the pupil could be carried but slightly beyond the median line. Nasal rotation fair but less free than that of the left eye. Looking upwards, the rotation of the right eye exceeds that of the left, recalling the fact that R. hyperphoria had been found four years before. The left eye moves freely in every direction with no restriction of the action of any muscle.

In looking directly forward at an object twenty feet distant it is the *right eye that fixes the object* while the left squinted inward in an irregular jerking manner, moving in and out but never out sufficient to induce even apparent parallelism, the cornea being, for the most part, buried in the inner canthus.

Occasionally, by an effort he can fix the left eye upon the object, in which case the right eye turns in but not to the extent to which the left deviates when the right is in fixation. Thus it happens that the eye with an apparent paresis of the external rectus occupied in fixation while it is the healthy eye which habitually squints.

Ophthalmoscope, hyperæmia of both discs. Vision $\frac{20}{40}$ each with Sph.+0.75 D. Reads with Sph.+3.00 D.

When the patient looks at any object, as in trying to read, or when he takes

an object in his hand, the head, hands and arms were set into an active tremor. If he is passive, neither looking intently or holding an object by an exertion of the hands, the tremor ceases. His voice also had a tremor and he spoke in scanning tones. In walking, he goes with a shaking, jerking gate, not with the swing of ataxia. He can stand with feet pressed together and look upward without losing his balance. Knee reflex much exaggerated. Is excitable and nervous. Patient now states that he had a chancre about four years ago, that it healed quickly and that he had no trouble from it until about a year ago, when he had a sore upon the face. He has been under constitutional treatment ever since. He denies having had any such disease previously to the time above mentioned.

The only treatment of the eyes at the time of this last consultation was the application of a cover to the right eye.

Jan. 23d. He has kept the eye faithfully covered. He says that he is less confused and feels better. It is interesting to note that, from some cause, his tremors are much less prononnced than at his last visit. His voice is nearly natural and his hands and arms do not shake when he looks intently or when he reaches for any thing. He still walks with a jerking movement but the jerk is less violent than before. All the rotations of the right eye are better.

March 2d. Patient walks better, speaks better and there is no tremor of hands or arms. Single vision looking directly forwards, homonymous diplopia when looking to the right.

March 25th. Esoph. or exoph. 0°, R. hyperph. 2°, exoph. in A. 8°, abduct. 7°. No diplopia with red glass. Rotation of the two eyes equal, or, temporal rotation of right possibly very slightly restricted. Thus the muscular tests were almost exactly the same as when the patient was first examined in March, 1887.

March 31st. Muscle responses much as above. Single vision with red glass until face is turned at an angle of 30° or 40° from the direct line, when homonymous diplopia of 2° results.

May 26th. Rotation to temporal side, right, equal to that of the other. The health of the patient is now in every way as good as it was when I first knew h[illegible]n, four years ago. The cover is now removed from the eye and glasses corre[illegible]ng his slight hypermetropia and including a prism 1° each for R. hyperph[illegible] are substituted.

Oct. 5th, 1891. The patient continues as well as before.

In all these cases in which persons who having habitually enjoyed single vision, suddenly without any apparent cause find themselves seeing double, our attention may properly be directed to two classes of causes and these two may not be so widely different as they might at first appear.

1st. In a case of original heterophoria in which the patient, by virtue of a strong will and a good control of the eye muscles has been able to overcome a strong tendency to deviation, in the event of disease, excessive fatigue or depressing surroundings, may suddenly lose his hold and the ability to overcome the original defect is not only lost but the exhausted muscles may not be able to perform even the duty which would have been required under circumstances of the best balancing; and thus we may have, temporarily, a condition of diplopia greater than would result from the original deviating tendency, were the exact impulse required in orthophoria directed to the adjustments.

2nd. Neurologists are familiar with the sudden occurrence of diplopia in loco-motor ataxia and other degenerative changes of the cerebro-spinal-system. Indeed diplopia is one of the very ordinary

signs of this class of affections. In the disease known as disseminated cerebral and spinal sclerosis, the prominent symptoms of which are so well represented in our second case, it is the external rectus that is said to be most liable to paresis.

In many cases in which we have evidences of organic changes of the nervous centres, the first class of influences above mentioned, namely, fatigue, exhaustion and the like, may be and probably is an element of great importance in the causation of diplopia. Indeed, in the course of an experience running back some years, in which it has been my fortune to examine the eyes of many persons who at the earlier examinations gave no evidence that they were then suffering or had suffered from organic nervous changes but who at later periods have manifested such changes, my examinations have revealed, not so much new conditions of the ocular muscles as exaggerations of original defects. This fact has been so repeatedly presented to my mind that, placing it with other important facts which the limits of this paper do not permit me to discuss, I am prepared to express my conviction that the ocular paresis of ataxia and of kindred diseases are, very often, the exaggerations of normal defects. For example; paresis of a superior rectus in such cases, most frequently occurs in a muscle whose functions have been originally performed under circumstances of peculiar perplexity and exhaustion.

In some of these cases, however, the paresis of a special muscle is more apparent than real. In our second case, for example, there was an inability to rotate the right eye outward and there was homonymous diplopia. The ability to rotate the left eye outward and in every direction being unimpaired, the conclusion might easily follow that we had paresis of the right externus. To such a conclusion I am not ready to subscribe. We had in this case, in 1887, R. hyperphoria of an important degree and when the diplopia occurred there was R. hypertropia with some excess of rotation by the right superior rectus.

The fact that this patient who could not rotate the right eye to the temporal side but who could rotate the left to either side and who yet used the right eye in fixation, turning the left to the nose in a pronounced convergent squint, indicates, beyond a reasonable doubt that the external rectus was not in a state of paresis and that the fault lay in the adjustments in respect to the tensions of hyperphoria.

It is an important fact that the lateral rotation of the eye is very frequently restricted or exaggerated by, or at least in connection with, a high degree of vertical deviating tendency. In the case of our patient, there was an orginal hyperphoria and later, hypertropia, whether this last was a feature of the paretic state or a revelation of the original and habitual condition, is in this connection unimportant.

When the eye had been covered for a time and the tired muscles

which move the eye up and down had regained something of their usual functional powers, the lateral rotation was restored.

There is another thought upon which we may only touch but it is one which might occupy a prominent place in the attention of neurologists, namely, that when our patient's eye had been covered a few days, a class of clearly defined symptoms was modified to a surprising extent and that the great improvement continues.

One case does not establish a principle, but the case here related is only a fair example of scores in which a similar result has been observed.

In the light of such facts, is it unreasonable to direct attention to these inherited mal-adjustments of the eyes as an important class of causes not only of functional disturbances but of organic changes of the nervous centres?

We have opened in this brief discussion a topic of weighty importance and of great extent. Here we can do no more than suggest the topic.

But the question of our correspondents, to which we started to reply, "Would you advise correction by an operation or would you wait?", has been answered in what we have already said. The appearance of diplopia in a patient who has been accustomed to single vision does not call for operative interference until all the facts are known and all hope of a restoration by rest and proper attention to the various muscular tendencies has been abandoned. Then, if an operation is required, it is not necessarially or perhaps usually, a tenotomy which is demanded.

A suggestion from these inquiries is, that the oculist should not confine himself in his examination to the single phenomenon which has startled his patient. The mere fact that a patient exhibits hypertropia of a certain number of degrees or esotropia of a given extent is but the beginning of an examination. Every tendency, every rotation, every action of each eye separately and of the two eyes working together and every physical fact in the patient's present and past history, must make a part of any examination which is to be of value to the patient or credit to the surgeon.

EXCISION OF THE MEMBRANA TYMPANI AND NECROTIC MALLEUS IN FOUR CASES OF CHRONIC SUPPURATIVE OTITIS MEDIA.

By Charles H. Burnett, A. M., M. D.

EMERITUS PROFESSOR OF OTOLOGY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF OTOLOGY IN THE WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA; AURAL SURGEON, PRESBYTERIAN HOSPITAL, ETC., PHILADELPHIA.

This paper gives an account of four cases of chronic purulent otitis media, in the first three of which all forms of rational routine treatment were pursued for long periods before resorting to the surgical procedure. In the last case, as long continued treatment of the suppurating ear, at the hands of other physicians had failed to give relief, I at once resorted to excision of the remnant of the membrana and carious malleus. The caries of the malleus was not recognized, though it was suspected before the operation in the first two cases. It was known to exist in the last two before the operation. In all of the cases the patients were etherized and the ear illuminated by the electric head-lamp during the operation. The cases were all in the private practice of the writer.

Case 1.—Mr. W. N. R. age 30 years was first seen April 11th, 1889, in consultation with his physician. The patient was in bed where he had been for some days. It was stated that he had had chronic purulent discharge from the right ear since childhood, but that nothing had ever been done for it. Four days previous to the consultation he was suddenly attacked in the street, with nausea and dizziness attended with a sudden discharge of bloody serum from and pain in the ear. The hearing was reduced to zero; the tuning fork on the vertex was not heard in the affected ear; the Eustachian tube was pervious to valsalvan inflation. Examination of the ear revealed a large perforation in the membrana flaccida, covered by a polypus. The malleus was maintained in an upper posterior white remnant of the thickened membrane. Anteriorly, stretching from the anterior portion of the annulus tympanicus to the promontory over the tympanic mouth of the Eustachian tube, was a thick, red, denuded and secreting diaphragm, perforated in its centre, through which air, and a little mucus would pass upon valsalvan inflation.

Treatment. The ear was at once regularly cleaned and antisepsis maintained by injections and instillations of carbolic acid solution (2.50 per cent). The vertigo gradually ceased in ten days after I first saw the patient, and he was able to leave the house. The polypus was then removed by a wire-snare without pain or hemorrhage and the pedicle touched with a minute quantity of chromic acid. A powder of iodoform and boric acid (1-7,) was insufflated into the ear, and antisepsis maintained for some weeks by insufflations of this powder and injections of the carbolic acid solution named above. The discharge diminished and the polypus did not reappear.

Upon sudden motion and muscular exercise as at lawn-tennis, the patient would feel considerable dizziness and he therefore desisted from the game for some weeks. By July 1st two months from the time of the first examination, the discharge from the ear, had become very slight and the patient went on a journey for two months, using during this time daily instillations of alcohol, but no syringing. By September 1st, when the patient returned from his vacation the discharge was slight, but offensive in odor, coming from the attic of the tympanum. However the use of peroxid of hydrogen and antiseptic injections with the tympanic syringe into the attic space several

times a week failed to check the purulency. Neither these, nor careful, antiseptic instillations by the patient every day at home, continued for months, succeeded in checking the annoying and ill-smelling discharge.

Necrosis in the attic was suspected and the operation subsequently revealed it, as the cause of this obstinate discharge. Therefore on June 17th, 1890 over a year from time of the first examination, the patient was etherized, and the remnant of the membrana tympani with the malleus was excised. The hemorrhage was inconsiderable. The head of the malleus was partly destroyed by necrosis. Dense synechial bands were attached firmly to the neck of the malleus and granulations covered the inner surface of the membrana tympani. A probe passed into the attic revealed an ample space without trace of incus or stapes. There were some granulations in the attic, which were broken up by the probe. Antisepsis by means of per oxide of hydrogen and a solution of carbolic acid (2,50 per cent.) preceded by syringing twice daily was kept up by the patient at home. The discharge began to diminish greatly now that necrotic tissue was removed and drainage improved and in a few weeks the antiseptic treatment was applied only once daily, then every other day as the discharge diminished and finally only when the discharge was perceived in the ear, which occurred at longer and longer intervals. By March 7th, 1891 the ear was entirely free from suppuration or discharge and has remained so. The attic space is dry and white and the diaphragm in the front part of tympanic cavity is pale pink and dry, being covered with epithelium. Air passes through the perforation in it, without mucus.

The attack of vertigo, pain and discharge of bloody serum from the ear which first lead the patient to give serious attention to his running ear, was due in the writers opinion, to an irruption of the chronic purulent disease into the vestibule through the oval window. This would cause the sudden vertigo and pain, and the presence of the polypus, which bled readily, would stain the serum which had escaped from the labyrinth. The cure of the discharge in this case, due entirely to the operation proved a great benefit to the health of the patient.

CASE 2.—Helen S., aged fourteen years, a full blonde who has not yet menstruated, was brought to me for treatment, May 5th, 1890. Her father stated that his child had been afflicted with chronic purulent discharge from the right ear, for five or six years. The disease had come on originally without any known cause, and had seemed to vary with the child's health, especially being worse with a cold in the head. Periods of six months had elapsed during these years, without any discharge from the ear. Several years ago following an attack of ear pain an abscess formed behind the ear and was opened by a well-known surgeon, giving vent to considerable pus. The treatment of the ear had been done at home and consisted in instillations of solutions of boric acid and latterly in insufflations of boric acid powder. Examination of the patient revealed a sunken cicatrix, behind the auricle over the region of the mastoid antrum. The membrana tympani was sunken and macerated by a little pus at the fundus of the canal and there was a perforation in it, below and in front. There was a small polyp attached to an exostotic elevation near the upper posterior quadrant of the insertion of the membrana tympani. The hearing was reduced to one inch for a large tuning fork, *per aer*, and for isolated words, to about six inches. The polypus was removed by the wire snare and its pedicle touched with a little chromic acid. Boric acid was then insufflated and antisepsis maintained by occasional syringing and daily instillation of a bichloride solution,* for three weeks; but this treatment seemed to *increase the discharge.*

Knowing of the long treatment with boric acid and also perceiving that the same treatment at my hands, seemed to make the discharge worse and that

*Bichloride of mercury ¼ grain; Tartaric acid 10 grains; Water 3 ounces.

the perforation in the membrana tympani was too small to permit good drainage from the tympanic cavity with its swollen mucous membrane, nor the entrance of medication to the diseased drum cavity, I proposed excision of the membrana tympani and the malleus. The patient was etherized, June 11th, 1890 and the membrana and the malleus were excised. Granulations were found blocking the drum cavity, on the promontory and on the inner surface of the membrana tympani. The hemorrhage was considerable and the operation tedious on this account and also as the malleus was adherent to the inner wall of drum cavity.

The head and neck of the malleus were not necrotic but granulations were attached to the neck. The lower end of the manubrium was destroyed by necrosis. The incus could neither be seen nor felt. From this time the discharge became very slight, not enough to appear at the meatus. Antisepsis was kept up by iodoform and boric acid powder (1-7) and a syringing every few days. In two weeks the hearing was found to have advanced from *ten inches* to *four feet*. During the following two months the ear was syringed once or twice a week with alcohol and water (half ounce to the pint). In September, three months after the operation the ear was found to discharge with a cold in the head but to be quite dry in the interim.

Since that time, *i. e.* for a year, the ear has generally been entirely dry part of each month to begin again to discharge. The discharge seems to come from the eustachian region, the anterior part of the inner tympanic wall being red and granular at times. The upper posterior part of the drum cavity is dry and white as is the front part of the cavity, part of each month. Air is forced from the eustachian tube by valsalva's inflation. As the menses have not been established, the patient being in her fifteenth year, the alternating conditions in the drum just mentioned suggest a vicarious action. At present the treatment consists in daily instillations of peroxide of hydrogen, then syringing with salt and water (5 per cent.) and then an instillation of a solution of sulphate of copper (grj to f℥j). The hearing is at present ten feet, measured in the presence of the father.

CASE 3.—Miss F. D. age 48 years, has been annoyed with suppuration in the left attic for years, the discharging pus coming from a perforation in the membrana flaccida, the rest of the membrana tympani being normal. At times there would be collections of cholesteatomatous scales in the attic, which would stop the perforation and mechanically check the discharge. This was invariably attended with pain, disagreeable head symptoms and depression of spirits. The hearing diminished to nothing. I had seen the patient at long intervals during ten years previous to her visit to me in April 1890. She then stated that she had been annoyed for some months by a slight offensive discharge and that she had removed some flakes (cholesteatomatous) from her ear. Latterly the ear had grown sore and painful and there was some dizziness.

She had heard of excision of the membrana tympani and asked to have it performed on her, if I advised it. Examination revealed a large perforation involving the membrana flaccida and the segment of Rivinus, in which a large, tough whitish plug was seen protruding from the attic space. Some of this was picked away and some more worked its own way from the perforation, after instillations of a solution of bicarbonate of soda, glycerin and water. The discomfort in the ear ceased and it was now seen that the attic space was entirely clear of any ossicles, but its mucous membrane was rough and granulating. The membrana vibran with the manubrium was seen to form with the inner tympanic wall, a pocket. Cholesteatomatous masses had collected here probably at each attack of pain and dizziness. The hearing was nil. Therefore the patient was etherized May 7th, 1890 and the membrana tympani with the manubrium mallei was excised.

The hemorrhage amounted to about half an ounce. The membrana tympani was very much thickened, its outer surface white and its inner surface covered with granulations, as was also the mucous membrane on the promontory. The head, neck and short process of the malleus were destroyed by necrosis. A little iodoform and boric acid powder was blown into the ear and the ear let alone for a day or two. By May 19th twelve days after the operation the ear was entirely dry; the mucous membrane of the drum cavity dry, pink, and shining. Hearing=12 inches for isolated words. June 6th, hearing=18 inches, isolated words. The ear has remained in this healthy condition to the present time.

When this case came to me in April, there was and had been for some time numbness in the tongue on the left side and a subjective metallic taste. This continued for nearly six months, gradually diminishing and finally disappeared. It was doubtless due to severance of the chorda tympani, by the same process as destroyed the incus and the head and neck of the malleus.

CASE 4.—Mrs. S. of Idaho, 35 years old consulted me July 14th, 1891 for chronic purulent discharge from the right ear, and deafness. She is affected with chronic catarrh of the middle ear on the left side. She had scarlatina at four years of age, since which the right ear has discharged. This ear has been treated in some way, by other surgeons, within the last few years. The patient has always worn cotton in her ear. Examination revealed a large central heart-shaped perforation in which was the stump of the malleus round and red, looking like a polypus. The probe revealed necrosis of the lower end of the hammer handle. Hearing in the right ear=6 inches and in the left ear=18 inches. Iat once advised excision of the membrana and necrotic malleus and the operation was performed, with patient under ether, July 17th, 1891.

The malleus handle was found destroyed by necrosis as far up as the short process. The articular surface of the head of the malleus was carious. No trace of incus could be found and the caries of the malleus-head leads to the supposition that the incus had been destroyed by the same process as involved the malleus-head. Immediately upon recovery from ether the patient heard sounds and voices in the room and in the corridor of the hospital private room, previously unheard in the right ear. Examination the day after the operation, showed the hearing to be 18 inches for isolate dwords, in the right ear. The discharge was slight and largely mucous, in its nature. The patient was directed to syringe the ear once daily with salt and water (5 per cent.) and to instill ten drops of the peroxide of hydrogen into the ear.

On August 4th the hearing was found to be two feet for isolated words in the right ear, being now a better ear than the left one.

September 9th 1891. The hearing is *six to eight feet* for isolated words in the right ear and there is no discharge.

In the first case the suppuration was checked in nine months. The hearing was not improved.

In the second case the discharge has not yet been checked, after the lapse of more than a year since the operation. The hearing however has been improved, rising from six inches to four feet, in two weeks after the operation, and is ten feet for isolated words at the present time.

In the third case, attic suppuration, the discharge and cholesteatomatous collections were checked at once and there has been no return. More than a year has elapsed since the operation. The hearing has risen from nothing to two feet.

In the fourth case the discharge has been checked in about two months and the hearing has risen from eighteen inches to six and eight feet.

The improvement in hearing whenever it has occurred in the foregoing cases is certainly due to the removal of obstructions to the entrance of sound waves into the middle ear. Since the operation they have been falling quite directly upon the stapes and the oval window.

The progressive improvement in hearing noted in all of them is due to the gradual overcoming of an ankylosis due to long disuse of the stapes from faulty articulation or discontinuity in the diseased ossicular chain.

DEAFNESS THE RESULT OF THE POISON OF SYPHILIS;

ITS TREATMENT BY MURIATE OF PILOCARPIN IN ACUTE SYPHILITIC AND LABYRINTHINE DISEASE OF THE INTERNAL EAR; ALSO ITS USE IN CHRONIC DISEASE OF THE EAR WITH LABYRINTHINE SYMPTOMS.

By Laurence Turnbull, M. D., Ph. G.,

AURAL SURGEON TO THE JEFFERSON MEDICAL COLLEGE HOSPITAL, ETC., PHILADELPHIA, PENN.

The number of cases of syphilitic diseased of the ear are much less numerous in the United States than in Great Britain or on the Continent. This fact we have proven by repeated visits and examinations of hospitals and clinics, both public and private, of Europe. We also quote the careful observations of one of their most distinguished surgeons, Dr. Dalby, who states in the *London Lancet:* "Next to scarlet fever, inherited syphilis may be reckoned as the most fruitful cause of deafmu-tism."

In the United States, in a practice extending over many years, in a city of eight hundred and fifteen thousand inhabitants, the proportion of cases of syphilitic disease of the ear is about sixteen in one thousand, while in our public clinics at Howard and then at Jefferson College Hospitals the number shows a decrease as compared with our private record. This fact is in part owing to the greater amount of care and time given to the private histories of the cases in our private record, which includes investigations into heredity, etc. The same facts are proven by reference to the statistics of the institutions for the instruction of deaf mutes in the United States. By examining their reports it will be found that the largest number of non-congenital deaf mute cases are placed under scarlet fever, spotted fever, a low form of epidemic typhus; then follows in order of frequency cerebro-spinal meningitis, etc. This, however, may arise from the fact that very few of the superintendents are medical men, and therefore are not always competent to judge of the histories accompanying the pupils, which they often re-

ceive, not from the family physician, but from parents, guardians or friends, who should have referred them to the attending or consulting physician.

History.—As early as June, 1853, Wilde of Dublin, published the most distinct account of syphilitic affections of the ear in his work on Diseases of the Ear; but he unfortunately dwelt too much on the local manifestations occurring in the membrana tympani and of the tympanic cavity, while he neglected to note the conditions of the nervous element. The same syphilitic poison which produces alternately an affection of the eye and ear was termed by Sir William "an inflammatory affection." In the work of Joseph Toynbee but little information is given concerning syphilitic affections of the ear, but this was remedied in the edition issued in 1868, with a supplement, by the late James Hinton, Aural Surgeon to Guy's Hospital, because he states that more than one-twentieth of the aural out-door patients present the now familiar aspect of hereditary syphilis, and have, in every case he has met with, suffered from impaired vision before the deafness has arisen. He further observes; "I know no other affection, except fever, which in a person under twenty brings on deafness so rapid and so nearly complete." In the course of a few weeks, a patient, previously hearing well, will without pain or known cause, become unable to distinguish words. Perhaps her eyes which has been long inflamed, have about the same time become better. On examination it is found that a tuning fork placed on the head is heard for a very short time, or not at all; the meatus is not always free from wax, the membrana tympani looks somewhat white and rough—it may be flat or concave, but it generally has a dried up white look. The Eustachian tubes may or may not be pervious. From the symptoms, however, it is evident that, as in the case of the eye, both the conducting and the nervous apparatus are liable to be involved in this disease. The peculiarly harsh sound produced by passing air into the tympanum suggests the presence there of rough, rigid lymph, and total deafness proves that the labyrinth has suffered.

Diagnosis.—Often at a glance and with a brief history of the patient, the syphilitic affections of the skin of the external ear, soft palate, tonsils, or pharynx are recognized, when associated with a dull pain in and about the ear, and pronounced tinnitus. If we find recent ulcers of an excavating nature, with everted edges, in the mucous membrane, or extending to the osseous walls, also necrosed bone, from the septum; spongy bones, or the floor of the septum with a peculiar and characteristic odor; this will show a recent attack of the disease.

Should the individual be profoundly deaf, have dry white patches on the membrana tympani, associated with radiating cicatrices in the pharynx, with swollen, contracted, or even closed Eustachian tubes,

loss of perception of sound through the bones of the head, we may be almost sure that we have labyrinthine syphilis to treat. In young children or half grown persons, of both sexes, without objective symptoms of middle ear disease, we should also suspect labyrinthine syphilis, even, when the primary infection was denied by the parents or guardians of such young persons. The diagnosis is confirmed if we find swollen lymphatic glands over the mastoid process.

PATHOLOGY.—The pathology of the various forms of changes in the ear, produced by syphilis is a matter of great importance and should be dwelt upon. It has been observed that hyperæmia exists in the vestibule at the entrance of the cochlea and horizontal semicircular canals, in a case of tympanic catarrh and probably periostitis in a syphilitic person. In a syphilitic soldier who died of exanthematic typhus, there was found considerable hyperæmia of the tympanic mucous membrane and the membranous labyrinth which appeared to be a good deal thickened. The labyrinthine liquid was sanguinolent and abundant.

Myringitis, anchylosis of the ossicles, with adhesive inflammation of the labyrinth, with deposits of chalky concretions on the membranous semicircular canals and sacs.

In a reported case of secondary syphilis, in which deafness, annoying tinnitus aurium, and osteocopic pains in the skull were complained of, hearing was rapidly destroyed. The autopsy showed the external and middle ear intact, sclerosis of the petrous portion of the vestibule, and small-celled infiltration of the membranous labyrinth, with anchylosis of the stapes to the fenestra ovalis. The trunk of the acoustic nerve was found unchanged.

In a new born child with congenital syphilis both perforations were below the manubrium, so that they could not be referred to an arrest of development.

In dissecting the petrous bones in one syphilitic case, there was found a congested state of the tympanic mucous membrane on the right side, and some old adhesions at the upper part of each tympanum, the membrana tympani very concave, the Eustachian tubes containing mucus; each vestibule was much congested.

The ulcers found with constitutional syphilis are annular and covered with a dirty grayish white exudation, and from their edges being greatly swollen they cause contraction of the meatus, and when they exist the lymph glands in the vicinity of the ear are much swollen.

The serous catarrh (otitis media serosa) is found with syphilis, and is an inflammatory dropsy of the tympanum, of a yellowish red color. It is the least common and should not be mistaken for the very simple transudation (hydrops ex vacuo) which results from the closure of the Eustachian tube.

Certain changes in the cerebral arteries have been discovered by

"Huebner and Barlow," and these same changes no doubt occur in the arteries which supply the ear, in syphilitic disease of this organ. These changes are opacity and marked thickening of the vessel with diminution in its caliber. The thickening is chiefly in the inner coat, while the outer coat is abnormally vascular and filtrated. "Charcot and Gombault" describe a syphilitic lesion of the brain substance, which consists in the formation of disseminated small nodules either on the surface or at the depth of the nerve centres.

The ulcers of the Eustachian tubes, in syphilis, which extend from the pharyngeal mocous membrane, are much deeper reaching the cartilage itself, and even penetrating its substance. Syphilitic excrescences, like the pointed condylomata, are sometimes seen at the osteum pharyngeum.

Syphilitic mucous patches on the tonsils, when examined under the microscope, show the latter to be seated on the mucous membrane which covers the gland. The epithelial layers are thickened; some of the superficial epitheliæ were swollen and vascular; the papillæ of the mucous corium beneath were hypertrophied. It is to the hypertrophy that the prominence of the patches is due. The more profound syphilitic lesions of the mucous membrane begin by an induration of the corium and of the submucous tissue by deep nodules or gummata, which very soon ulcerate. By a careful examination it will be found that the syphilitic disease affects the most vital portion of the internal ear (the labyrinth), which becomes thickened in its membranous covering, and the fluid which it contains is bloody and increased in quantity. This accounts for the profound deafness. Second, we have the semicircular canals hyperæmic, with a deposit of chalk concretions on the membranous portions of these canals, which accounts for the staggering gait of the patient, or a tendency to fall. Third, we have alterations in the bone structure which contains the most important and delicate parts of the ear, the petrous portion of the temporal bone. Fourth, we have anchylosis of the stapes and the walls of the fenestra ovalis, so that it has no power to move by the influence of sonorous vibrations, which are conveyed in mass, and not in musical tones.

In syphilitic necrosis of flat bones there is a new osseous formation which takes place at the edge. The diploë of the bones becomes more compact, and upon their external surface small hyperostoses are met with. A microscopical examination of the sequestra shows the medullary cavities of the diploe replaced by very narrow canals, and the transformation has taken place in consequence of the formation of osseous tissue which, being deposited layer by layer in the interior of the canals, has narrowed them. The purulent inflammation of both ears, with perforation, or evidences of the same, in new born children, the result of congenital syphilis, accounts for many of the cases of congeni-

tal deaf mutism. The dropsy and changes in the membrana tympani account for its white and dried character and appearance. The deep-seated ulcers in the Eustachian tube, unless very promptly treated, must in a very short time, destroy the function of this important part of the ear, while the pointed condylomata destroy and contract the meatus for the reception of sonorous vibrations.

PROGNOSIS.—The prognosis in these affections of the ear depends almost entirely upon the stage at which the person is suffering from syphilis, and also the duration of the disease. In primary and secondary manifestations much benefit will result from a careful and active treatment, both local and general. In the tertiary cases among the poor the prospect is unfavorable, while with the wealthy, and even those having the comforts of home, proper food and attention, most cases will recover if brought to the aural surgeon in the early stage, and while the general health is good.

TREATMENT.—Condylomata of the external auditory meatus. The excrescences are to be touched with nitrate of silver, after which a poultice should be applied. The subsequent treatment consists in washing over the morbid growths with a strong solution of nitrate of silver, every second or third day, and in the intermediate time keeping a dossil of fine lint, wet with diluted liquor plumbi, applied to the concha; besides the internal administration of Plummer's pill* and sarsaparilla. By persisting in this treatment for upwards of two months, the condylomata will usually disappear leaving the meatus natural, when the membrana tympani will be found unimpaired and the hearing restored. Broad condylomata in the external meatus occur mostly on one side only, and in persons whose ear canals are narrow. They begin in the depth of the meatus with red patches which develop into slight elevations (papulae) and well marked condylomata.

Mild cases are sometimes cured by cleanliness and constitutional treatment *alone;* severe cases require local treatment additionally, namely, abscissions of the prominent excrescences, cautious touching of the deeper ones with nitrate of mercury or silver in substance, and most careful cleansing with a weak solution of iodide of zinc and permanganate and chlorate of potash. In other cases, in the treatment of condylomata situated in the external meatus, or on the edge of the membrana tympani, or in the throat—the latter being the locality in which we have most frequently found them to occur—we employ nitrate of mercury in solution of one part to twelve in water applied to the part so as to destroy not only the superficial covering, but the deeper diseased tissue. The parts should be washed with lime water and calomel; also apply a dossil of lint with powdered iodoform and tannic acid to the meatus.

*Pilulæ antimonii compositae, U. S. P.

Of constitutional measures we prefer the hypodermatic injection of the bichloride of mercury, or the biniodide compound solution or biniodide pills.

℞ Red iodide of mercury . . . gr. xvss.
Iodide of potassium . . . ℥j. ℥v.
Distilled water . . . . f℥ij.

M. Dissolve and filter, then add simple syrup until the whole measures fifty fluid ounces.

Dose, one tablespoonful, containing one-seventh of a grain of the red iodide of mercury, and seven and three-quarter grains of the iodide of potassium, may be given three times a day.

If the weather is cool and damp, care should be taken to have the patient well covered with warm clothing, and he should have a full meat diet, avoiding green vegetables or acid fruits, and employing tonics to nourish the system. In the treatment of what is known now as "Heredito-syphilitic" affections of the ear, associated with eye affections, to which a reference has already been made, and which comprises much the smallest number of cases—which are almost all the result of the disease being received by the mother and transmitted to the child—it is in this class of cases, that almost all of them have some affection of the eyes; in sixteen, six had at one time keratitis, and were liable at times to relapses. There cannot be a doubt in our own mind that there must be a pathological reflex relation between the eye and the ear. This may be through the medium of the trigeminus; as the following cases will illustrate:

1.—A man lost his right eye by a wound from a fragment of iron producing traumatic cataract; as a result of this accident he became deaf in the right ear. He received a similar fragment in the left eye and he became deaf in the left ear. He was an alcoholic subject. 2.—A child aged twelve, was struck by a snow-ball in the right eye; he became deaf in the right ear. Father and mother were syphilitic. 3.—A girl, aged eighteen, scrofulous, deaf, and almost blind; multiple lesions of the sclerotic, cornea, and iris, by double iridectomy sight was restored to the patient and hearing improved. 4.—A girl, aged eight, deaf, ocular lesion; iridectomy performed amelioration of vision, and diminution of deafness.

There is a ready connection between the eye and the throat, through the duct and lachrymal canal to the nose, along the Eustachian tube to the middle ear, and then extension to the labyrinth. In this class of cases in children or young persons, if mercury has not been employed, a fair careful trial must be made with it, in the form of hydrarg. cum creta, with a small quantity of opium, with children, or even calomel, well guarded; or by the use of mercurial ointment; or still better, the oleate of mercury by inunction, followed by syrup of iodide of iron and nourishing diet. The patient usually states that the dizziness and deafness which follow the eye affection are very sudden; but by careful inquiry it will be found that there was some pre-existing deafness. If we have found that the patient has been fully under the influence of

the mercurial for a considerable time, then we must resort to the iodide of potassium in large doses, kept up for months, the local treatment of the catarrhal deafness must be attended to. For the dizziness, resort must be had to the bromides, nux vomica and hydrobromic acid, being careful not to induce dyspepsia by their use.

CONCLUSIONS.

First.—That syphilitic diseases of the ear are less numerous in the United States than in Great Britain or Europe, and that it is not so frequently a cause of deaf mutism.

Second.—In almost all constitutional syphilitic diseases of the ear in children and young persons it is associated with some affection of the eyes, throat and nose. The deafness which often follows the improvement in the eyes is sometimes profound.

Third.—Persons who have suffered from constitutional syphilis, especially young persons and children, have great impairment of conduction of sounds through the bones of the head. Even in adults with constitutional syphilis the tuning fork in some instances cannot be heard on the bones of the head or face.

Fourth.—In a few cases the first indication of a diseased syphilitic ear is a primary ulcer in the throat, naso-pharyngeal space, or in the auditory canal, or near the membrana tympani.

Fifth.—Purulent otitis media, or otitis media serosa syphilitica, may occur in utero, or in very young infants, while in young persons and adults we may have congestion of the tympanic mucous membrane from the same cause, anchylosis of the bones of the ear, with bands of adhesion in the middle ear, by extension from the throat to the Eustachian tubes.

Sixth.—Syphilitic disease may affect the most vital part of the internal ear, labyrinth, semicircular canals and cochlea, with hyperæmia, marked thickening and dryness of the membranes of the round and oval vessels which supply the internal ear. There is also a disease of syphilitic nature in the auditory nerve, also the brain itself, in the formation of disseminated small nodules within the nerve centres. This form of disease of the ear is most successfully treated by the combined use of pilocarpine and mercury,* also in our more extensive experiments, with these agents noted in this paper.

Another valuable preparation in obscure syphilitic cases is the following, in which the mercury is combined with the pyrophosphate of iron preventing its irritating the rectum, and acting as a tonic in conjunction with the arsenic.

℞. Hydrarg. bichlor. . . . . gr. ½
Acid arsen . . . . . gr. ¼
Ferri pyrophosphate . . . . . gr. vj.
M. Ft. pil. No. xxiv. S—one three times a day.

Care must be exercised in the use of powerful drugs, as there have been cases of jarborandi and pilocarpine poisoning. Two cases have been reported of poisoning; one from two drachms of the fluid extract of jarborandi (which received no antidote), and the other from swallowing a considerable dose of the fluid solution of pilocarpine used for stimulating the hair, instead of a solution of quinine. In both cases the symptoms were profuse perspiration and salivation, dimness of sight, prostration, a sensation of cold tremor and extreme general debility. The treatment of the last pilocarpine case was with atropine, which was not employed in time.

*See pp. 496; Author's Manual of "Diseases of the Ear," for full account of cases, 2d Ed. J. B. Lippincott Co., Phila., Pa.

It has been pointed out that pilocarpine could easily be changed into jaborine, a substance acting like atropine, and Merck even claimed that jaborine was always present in minute quantities in commercial pilocarpine. And still another alkaloid besides pilocarpine and jaborine has recently been obtained by Meyer, which he termed pilocarpidine, and described in the *Archiv. fur experimentelle Pathologie*, 1886, vol. xx, Nos. 5 and 6. Omitting the chemical properties of the new alkaloid, which approximate those of pilocarpine closely, a writer in the *Therapeutic Gazette* briefly reviews its principal physiological features as follows: "The action of pilocarpidine is essentially identical with that of pilocarpine, only less pronounced. In a cat seven weeks old, which received 0.01 gramme of pilocarpidine hypodermatically, the drug induced a state of intoxication, which would have been fatal unless speedily counteracted by atropine. Among the most prominent symptoms of poisoning by pilocarpidine, Meyer mentions increased perspiration and lacrymation, besides diarrhœa, vomiting and dyspnœa. In rabbits pilocarpidine causes likewise salivation and diarrhœa, but does not, even in doses of 0.02 gramme (3 grains), susceptibly influence the respiratory and cardiac functions. While 0.01 gramme of pilocarpine (1¼ grain) produces in a rabbit profound intoxication and death. Meyer observed, after the subcutaneous employment of 0 05 gramme (7 grains) of pilocarpidine, no materially morbid symptoms; even 0.3 gramme (4½ grains) introduced directly into the circulation caused no intoxication. It is probable that the innocuousness of the drug results from its rapid decomposition in the animal organism. In frogs pilocarpidine showed likewise a much weaker action than pilocarpine. Jaboridine (an alkaloid into which pilocarpidine is easily changed) has hitherto, by Meyers, been tested exclusively on the frog's heart, and was found to closely resemble in its physiological properties those of jaborine and atropine, as intimated above.

Some ten years ago, the distinguished aurist, Professor Politzer, of Vienna, introduced and applied this valuable remedy pilocarpine the active principle of the "jarborandi," with success in deafness the result of the poison of syphilis. This therapeutic remedy was found to produce most active and powerful effects on all the secretions of the human body except the bile. It was also stated to even increase the cerumen of the human ear. Of this latter influence there is some doubt, and we have never noticed such results, even when the deafness has been improved by the use of pilocarpine, but no increase of ear wax. This is our experience of its use during the last nine years in which we have employed it in hundreds of cases.

Prof. Politzer[1] reported subsequently success with it in acute and even chronic affections of the labyrinth non-specific. In his later experiments he gradually increased the strength to a 2 per cent solution of the muriate of pilocarpine, of which he used from a 2 to 6 drops injection daily. The number of injections is from 6 to 40, into the forearm. This was used until salivation, sweating and incipient vomiting was induced. The depressing effects upon the heart, etc., were combated by 2 drops of solution of atropine sulp. (gr. ¼ to 2 drachms of distilled water.) Prof. Moss[2] of Heidelberg records a case of double labyrinthine disease of the ear after scarlatina, treated with success by hypodermatic injections of 2 per cent solution of muriate of pilocarpine. There were loud subjective noises. He injected 10 drops daily, and subsequently every other day to cause absorption of the fluid of the labyrinth.

The following are the physiological effects of this remedy when properly given and successful in its results. The dose is from 1-20 to 1-4 of a grain, used hypodermatically, gradually increasing. It produces flushed face with full and free perspiration, which continues for some hours increasingly. The patient being in bed and well covered up, there is also some free secretion from the eyes, nose, and throat of mucous, and at times nausea and even vomiting. The face is usually flushed and the pulse at first increased, and then reduced in frequency; there is also some disturbance in the action of the heart with a feeling as if it arose up into the chest. [3]Field says that he noticed increased secretion of the wax, and he mentions that in all his cases of labyrinthine deafness wax is usually absent; this we did not notice. It would

1Allgemeine Win. Med. Zeitung, Jan. 20, 1884. Dublin Jour. Med. Sci., July, 1884.
2Arch. Otology, Vol. xiii, Nos. 3 and 4, 1884.
3Brit. Med. Journal, April, 1890.

appear to him not improbable that the secretion of the inner ear should also be promoted by injections of the pilocarpine, seeing that the action of all the mucous membranes of the body is stimulated. The softening of the inflammatory accumulations which would result therefrom would greatly facilitate the removal by absorbents, and even if it did not cause their absolute disappearance, would so far relieve the pressure upon the auditory nerve-endings as to allow of a resumption of their functions. In these latter conclusions we fully agree with him. Dr. Lauder Brunton states in his Text book of Pharmacology that this increase of the secretions is due to the stimulation of the secretory nerve fibres.

Our first experiments with this agent were with cases of profound deafness, chiefly of a doubtful syphilitic class, and we endeavored to obtain a history from the patients or friends, even when this was positively denied, we always gave them the benefit of our doubt when there was suspicious symptoms. In primary cases the pilocarpine had to be followed up by mercurials, iodine or iodide of potassium to complete the case. Our chief assistant, Dr. S. MacCuen Smith, found the syrup of hydriodic acid to be successful in cases in which the iodide of potassium was not borne well by the stomach. If there was a suspicion of a gummata or solid deposit this extra treatment was absolutely necessary. In liquid or soft deposits in or about the internal ear, the pilocarpine answered alone; if the deposit is of bone it has no influence upon it.

Our second class of successful cases are those of sudden deafness from hyperæmia of the labyrinth, or effusion of blood or serum in its structure. In such cases the successful result amounted to from 2 to 3 in 50 cases. Our public clinic where we rarely see the cases until after the acute stage has passed, our results are nothing like as perfect as in private practice. We are usually glad to have the patient so improved as to be able to hear the voice and the tick of a watch or clock. We find that this class of patients are very grateful to be relieved in part of the depressing influence of this form of ear disease. Our chief clinical assistant, [1]Dr. S. MacCuen Smith, has treated 47 cases of greater or less impairment of hearing, some amounting to almost entire deafness, by the method of hypodermatic injections of pilocarpine muriate; of these 47 cases he was enabled to record the result of treatment in all but 3.

Of the 44 cases, 33 received marked relief; 7 were but slightly improved, and 4 received no benefit whatever. The improvement in tinnitus and vertigo was in most cases in direct ratio to the increase in hearing distance, and the improvement in general health; although in 14 cases the vertigo was alone relieved, while the tinnitus remained the same, or but slightly improved. It is not so apt to return as cures of chronic catarrhal deafness of the middle ear. Both in our public clinic at the Jefferson Medical College, and in our private practice the results obtained in the chronic form of deafness with this remedy was found useful, but not a perfect restorative of the hearing. Mr. Field, before quoted. states as his results 20 cases mostly labyrinthine disease, which under the pilocarpine injections were much benefitted. This is a guarded statement as he gives the results of only his favorable cases.

We find that the proportion of cures of this form of deafness are much less; we are gratified if the patient after treatment with pilocarpine for

[1]Trans. Philada. County Med. Society, June, 1891.

weeks and months be able to hear the human voice in ordinary conversation, and a watch which measures 60 inches—say 10 to 20, or even 30 inches.

The diseased parts which are affected include the labyrinth proper, semi-circular canals, cochlea, and auditory nerve; in white atrophy of this nerve this remedy is of little use; this remedy is also of little use in labyrinthine deafness the result of locomotor ataxia. It is of the greatest importance to use the tuning fork as before stated to determine where the disease is situated, either in the external, middle, or internal ear. Numerous and careful experiments are to be made in front of the ear, on the occiput, base of the skull, mastoid process and even on the nose, for without these careful experiments we will work in the dark.

We will now mention the other large class of cases with profound deafness, which have indications of labyrinthine disease by their symptoms as well as former indications of middle ear disease, either latent, active or cured. In this class we find but a few instances in which pilocarpine is of much benefit. It cannot be depended upon alone except to ameliorate the condition. This is especially the case if there are adhesions of the handle of the malleus to the membrane, or anchylosis or bony union of the ossicles, or sclerosis of the mucous membrane. In this latter class of cases Sexton advocates the removal of the malleus in cases of deafness due to chronic catarrh including sclerosis.

THE MODE OF USE OF PILOCARPINE.

It will be found that individuals are affected differently by the use of the drug; some requiring as large a dose as an eighth of a grain, or even a quarter of a grain, and others are affected by a twelfth or even a twentieth, producing profuse diaphoresis and secretion.

It is well to begin with a small dose, and gradually increase it, so as to watch its action on the heart, and should the patient reside at a distance from the physician, always prescribe a small tablet of $\frac{1}{150}$ of a grain of sulphate of atropia, to be used if great depression, of the heart, takes place following the use of the pilocarpine. The drug is to be found, for hypodermatic injection, in soluble tablets containing various doses recommended. It is now prepared in lozenges with sugar of milk to be used, three a day, for *dryness of the mouth*. Our best results have been secured with the patient in bed, and we employ it by hypodermatic injection every night, and then every other night, and watch it by increasing the dose until full results are obtained.

In post-exanthematous aural disease the injections of pilocarpine have been tested by Moos and J. Dunlop,[1] who report a case of mixed middle ear and labyrinthine disease of long standing caused by an attack of measles two months previously, which was practically cured by this

[1] Brit. Med. Journal, June 7, 1890.

mode of treatment. Still we would give a word of caution as there is danger of its use. as in a case of scarlet fever with deafness, a friend employed it with care but suddenly lost his patient, and all the discredit was given to the pilocarpine injections.

In mumps we have one of those diseased conditions in which total deafness in spite of great care on the part of the physician, has so often resulted. Pilocarpine has been tried, and has been found to improve the patient's condition, and Kosengarten[1] has recorded recently three cases of severe deafness after mumps in which hearing was completely restored.

It should be very clearly understood that in labyrinthine disease, in true typical cases, we usually find on examination of the external ear and auditory canal that they are normal; membrana-tympani generally congested and either bulging or retracted, with constant tinnitus, and auditory vertigo. The low notes of the tuning fork are at times perceived, but the high notes very rarely. The watch is not heard except in almost "close contact." The human bass voice can be heard, but not distinctly.

In the second class of cases of chronic aural diseases with labyrinthine symptoms, we are apt to find furunculous or desquamative disease of the canal occurring frequently, inflammation of the handle of the malleus; disease of the post nasal spaces and tonsils, with obstruction of the air passages, owing to disease of the Eustachian tubes. All of these diseased conditions must be recognized and treated before we employ pilocarpine.

1502 WALNUT STREET, December; 1891.

OTACOUSTIC TREATMENT IN CHRONIC DEAFNESS.

BY J. A. MALONEY, M. D.
WASHINGTON, D. C.

It is now four years since the presentation of the Otophone (by request) before the College of Physicians; its wonderful power of awaking audition, caused me to examine carefully this feature and relate cause to effect if possible. I was upon that occasion forcibly impressed with the utterance of Dr. C. H. Burnett of Philadelphia. "For, if chronic catarrhal deafness depends largely upon ankylosis of the ossicles in the drum cavity and if sound conveyed to them by the ear trumpet is passive motion applied to them and if passive motion tends to overcome ankylosis in any case, therefore the use of an ear trumpet will tend to improve permanently the hearing. This will be brought

1Kosengarten (Zeitschrift fur Ohronhulkunde, xx, p. 1-10; also Year Book of Treatment, p. 1-26 for 1891.

about not only by improving the mobility of the ossicula auditus but also by keeping the auditory nerve from falling into fatty degeneration." (See page. 125 Transactions of College of Physicians vol.—1x3 series)—again on page.—123 same vol—Dr. Burnett says: "Hearing depends upon a pendulum-like vibration in the sound-conductors of the ear. This upon the easy play of the three joints between the malleus and incus, the incus and the stapes, and the foot plate of the stapes in the oval window. When these joints are ankylosed, partially or wholly as they usually are then the mucous membrane covering them is the seat of catarrhal processes, it is easy to understand the mechanical cause of catarrhal deafness. As in any other ankylosed joints the impaired action in the articulations of the ossicula auditus can be overcome to a greater or less extent by passive motion. The mechanical force which acts most readily and naturally on these joints is sound. Hence when stiffened by disease and deafness is the result, sound collected and conveyed by some form of tube to the auditory canal and the membrana tympani in a more than ordinary amount and without acoustic interference, will overcome the ankylosis and the patient hears better. The otophone was a new departure in the art, because it prevented *acoustic interference* by reason of its being a closed tube.

The thought of a new field of treatment in chronic deafness occurred to me and I turned to physiological acoustics for light and knowledge, but I found the path had been traversed only partially, until the portals of this domain of science had been opened by Weber, Lucæ, Helmholtz, Politzer, Riemann, Henke and in our country Blake, Burnett, Sexton and others, but the literature upon this subject is sparsely and not special.

A great deal then was dependent upon tentative deduction. Up to this time Otology depended upon "Politzer Inflation," local applications; Siegel's Otoscope and later Delstanche's improvement upon same. In the first named slight benefit was conferred by equalizing the pressure upon each side of the "membrana tympani." In the use of Otoscope success was rare, why? Because it produced noise and the ear in the higher or lower animal shrinks from the same.

The laws governing motility are fixed and as immutable as the laws of the "Medes and Persians" this is demonstrated by the infant whose first movements are restricted.

In the patient with a fractured limb after removal of splints, the first movements of limb are restricted but gradually extend. In perfect accord with these laws stands "Otacoustic Treatment," taking for its essential of success "Composite or Articulate Tone" for by and through this the auditory apparatus receives its stimulus and retains its vitality.

The treatment is administered according to the conditions in each

case, demonstrated in part by responses of patient and combined with the well known methods of Otology in use at present. The question may be asked why are these results produced now? The answer is clear, the fault in majority of cases of chronic deafness lies in the transmitting mechanism of the middle ear which has not and cannot be reached by medication successfully. The results of my labors up to this date I lay before the profession in the following typical cases from my case book, attention being called to effect upon "Tinnitus Aurium" as well as audition.

CASE 1.—Ralph G., æt. 12, February 12th 1889. Diphtheria at 6 years. Before being brought to me the boy had been treated in this country and abroad. R. E. destruction of M. T. save a portion of membrana flaccida.

L. E. Otitis purulenta, exacerbations frequent from exposure, pain relieved by discharge. M. T. perforated and sclerotic, inflammation with suppuration frequently recurring slight naso-pharyngeal catarrh, excessive hypertrophy of tonsils, (almost touching each other.) Loud voice L. E.=2 inches, R. E.=0. Diagnosis had been made of paralysis of auditory nerve. The boy was an expert lip-reader and had the "deaf face" well developed.

After examination and tests I found after five minutes that he could hear moderate tone R. E. and range extended to 12 inches L. E. I made a favorable prognosis for development of hearing to serve practical purposes through life.

The usual local applications were used upon ears naso-pharynx and tonsils and Otacoustic treatment faithfully followed. On May 20th, 1889, (a little over three months) the hearing power had been brought up as follows; *with eyes closed* could hear ordinary conversation at 12 feet and this remained fixed up to time I last saw him, August 1889. The deaf face had disappeared he was ruddy and robust and I think it would puzzle an expert to discover that the boy had ever been profoundly deaf.

CASE 2.—Mrs. W. H. H., æt. 46, June 1st 1889. R. E. deaf for fifteen years W. on contact=0; L. E. W. aerial=6 inches. Fork test B. C. good. M. T. sclerotic, opaque retracted. Atrophic Nasal Catarrh. Tinnitus very persistent and varying. Patient was very skeptical of prognosis made after examination and tests, but her husband who was present urged her to proceed with treatment which she reluctantly did, local treatment with Otacoustic. After *thirty days* the following results were shown: W. R. E. aerial=9 inches; W. L. E. aerial=30 inches. Ordinary conversation heard readily in any part of room, *when patient is not looking at speaker*, tinnitus very much reduced. This patient is a neurotic and in the "climacteric period" at the time. In November 1890 she called to inform me that she had been ill with typhoid fever but her hearing remained good. At this time tests showed, W. R. E. aerial=16 inches; W. L. E. aerial=45 inches, tinnitus scarcely perceptible and then only at times.

CASE 3.—Miss Annie B. De-L., æt. 24, January 16th 1890. Post-scarlatinal deafness since early childhood. R. E. W.=0; L. E. W.=2 inches. Fork test B. C. good. Chronic muco-purulent discharge from left ear M. T. R. E. opaque, retracted and full of cicatrices. L. E. perforation in inferior posterior quadrant and tissue bathed in muco-purulent secretion. Expert lip reader. Treatment for discharge of L. E. was carried out under otologist who sent the case. I directed Otacoustic treatment to development of hearing in R. E. (worst) with disuse for rest because of sensitiveness (by closing meatus with wool) for L. E. during medication. At end of thirty days, Otacoustic treatment was used on both sides, the purulent discharge from L. E. having subsided. On May 8th 1890 conditions were, W. aerial R. E.=8 inches; W. aerial L. E. =25 inches; conversational tone of voice; R. E.=5 feet; L. E.=10 feet, without listener seeing speaker.

CASE 4.—Mr. J. Van. S., æt. 36, February 15th, 1889. Lip reader, deaf for twenty-five years on left side, three years right side. Had been under treatment for some years. W. L. E.=C; W. R. E. aerial=1 inch; V. L. E

meatus; V. R. E.=3 feet; Otorrhœa, R. E. this was treated by specialist who sent case. After four months conditions were; W. L. E. aerial=6 inches; W. R. E. aerial=20 inches. Ordinary conversation heard in any part of room, at a very low tone of voice at 3 feet with L. E. The deaf face in this case was pronounced at time of first visit. On May 19th patient presented a very robust appearance, no *deaf face*, a bright and cheerful countenance. V=conversation in an undertone between two persons at extreme end of room (15 feet). W. L. E.=16 inches; W. R. E.=40 inches.

CASE 5.—Kate McR. J. æt 8, June 1st, 1889. Scarlatina at 2 years. Profoundly deaf (no supposed hearing). Diagnosis by several specialists was paralysis of auditory nerve. A good lip reader for one so young. V. Loud meatus, L.E.=0; V. Loud meatus, L. E.=6 inches. Fork Test, R.E.=0; Fork Test L. E.=1 inch. Articulation very bad. After first six months the mother reported (this being an out of town case.) "I find it has been the means of great improvement in hearing and articulation." The father writing later to physician who referred case to me said: We feel satisfied, there is a marked improvement in her hearing, she now hears with both ears, she frequently asks "which is my good ear?"

CASE 6.—Noma S., æt. 6. Scarlatina at 5, deafness resulting. July 19th, 1890. W. R. E.=0; W. L. E.=0. Fork Test R. E. aerial=1 inch; Fork Test L. E. aerial=0; B. C. good. September 16th, 1890. Fork Test R. E. aerial=20 inches; Fork Test L. E. aerial=16 inches; W. R. E. 10 inches; W. L. E.=6 inches. Conversational tone of voice; R. E.=18 feet; L. E.=10 feet.

CASE 7.—Miss C. P., æt. 22. Supposed congenital. Sent by *an eminent New York* specialist, for determination of hearing power. Has been educated as a deaf mute by the "Bell Visible Speech" method. Upon examination I found hearing upon both sides, *and after ten minutes* she could *repeat* the test words naturally, conversation upon her part owing to system of education being in a monotone. For prognosis, I gave improvement and audition sufficient for articulation. I heard nothing from this case until five months had elapsed when the following report was sent from person carrying out my instructions. "In less than a month seventy-four words, and forty sentences had been learned and were recognized upon day of review, (end of month). At end of fifth month she had learned *and could repeat* many other words besides figures up to 100." A physician residing in same city becoming interested in the case requested a test in his presence. He selected figures up to 100 as test. The teacher then selecting figures here and there within this limit, called them to her and they were repeated without a mistake. Her mother could at this time, with unaided voice pronounce a word close to meatus and her daughter would repeat it. *This was the first time she ever heard her mother's voice.* I have heard nothing from this case since directly, but it was laid before the American Association to promote teaching of speech to the deaf in New York 1890. It was again referred to by the secretary of said Association in an invitation for me to deliver a lecture before that body upon the "Cultivation of Hearing" at their June meeting Lake George, N. Y. 1891.

CASE 8.—Thos. R. H., æt 16, September 21st, 1890. Diphtheria when an infant. Fork Test R. E. aerial=3 inches; Fork Test L. E. aerial=1 inch; V. R. E.=2 feet; V. L. E.=4 inches. March 16th, Fork Test R. E. aerial=17 inches; Fork Test L. E. aerial=16 inches; V. R. E. (moderate tone)=15 feet; V. L. E. (moderate tone)=10 feet.

CASE 9.—Mrs. E. F. R., æt 38, Sept. 30th, '90 "Otitis Media Catarrhalis Chronic". Tinnitus Aurium both sides, L. E. worst. Unfavorable prognosis by three eminent specialists. Had been under treatment for years. Fork Test R. E. aerial=2 inches; Fork Test L. E. aerial=0; B. C. good; V. R. E. Loud tone=6 feet; V. L. E. Loud tone=Meatus. December 30th, Fork Test R. E. aerial=7 inches; Fork Test L. E. aerial=4 inches. Tinnitus R. E. seldom noticed; Tinnitus L. E. very much reduced; V. R. E.=10 feet; V. L. E.=10 inches. November 13th, W. R. E.=1 inch; W. L. E.=C; V. Conversational tone R. E.=7 feet; V. Conversational tone L. E.=4 inches. November 28th, W. R. E.=4 inches; W. L. E.=2 inches; V. Conversational tone R. E.=12 feet; V. Conversational tone L. E.=10 inches; Whisper R. E.=7 inches; Whisper L. E.=1 inch. December 15th, W. R. E.=6 inches; W. L. E.=4 inches; V. R. E. Conversational tone=15 feet; V. L. E. Conversational tone

=4 feet. January 22nd, 1891. No tinnitus. W. R. E.=8 inches; W. L. E.= 6 inches; V. Conversational tone R. E.=16 feet; V. Conversational tone L. E.=6 feet; V. Whisper R. E.=8 inches; V. Whisper L. E.=4 inches. May 4th, W. R. E.=10 inches; W. L. E.=9 inches; V. Conversational tone R. E.=20 feet; L. E.=10 feet; Whisper R. E.=10 inches; L. E.=6 inches; no tinnitus. Upon first visit this patient stated the deafness was of minor importance compared to the suffering endured from the tinnitus and that she would be happy to get rid of it within two years. It is needless for me to say she has been very grateful.

CASE 10.—Mrs. G. W. B. Jr. This case was sent with history and conditions by specialists in another city, and at that time, August 23rd, 1890, W. R. E.=8 inches; W. L. E.=C. He reported under different dates as follows: W. R. E.=18 inches; W. L. E.=$\frac{1}{2}$ inch. November 19th, I have seen Mrs. B. but three times since she commenced your treatment on November 13th inst. she heard. W. R. E.=24 inches; L. E.=4 inches compared with R. E. 18 inches; L. E.=$\frac{1}{2}$ inches of October last she is delighted so am I. December 7th, reported "patient is still improving." February 20th, 1890, he reports W. R. E.=26 inches, L. E.=12 inches.

The deaf face in a majority of these cases disappear.

That is due to relief from neutral strain consequent upon lip reading, and the anxiety for relief, as the power of audition is restored.

The alleviation of tinnitus is due no doubt to the breaking up of adhesions or partial ankylosis of the conductors of sound lying in the middle ear.

1424 Q. STREET, N. W.

TRAUMATIC HÆMORRHAGE OF THE TYMPANUM CAUSING DEAFNESS WITH SUBSEQUENT RESTORATION OF HEARING, WITH REPORT OF CASES.

BY S. MACCUEN SMITH, M. D.,

CLINICAL CHIEF, AURAL DEPARTMENT JEFFERSON MEDICAL COLLEGE HOSPITAL, PHILADELPHIA; SURGEON IN CHARGE NOSE, THROAT AND EAR DEPARTMENT GERMANTOWN HOSPITAL AND DISPENSARY, PHILADELPHIA.

From a clinical point of view the following cases will be of much interest, as the result of treatment was most satisfactory. I consider this sufficient excuse to publish the same, with the hope that the following respective history may be an incentive to future investigation of similar cases, as the writer has personal knowledge of eleven cases of total deafness (traumatic) in which surgical measures have restored hearing to a greater or less degree, although the patients so afflicted had abandoned all hope of ever hearing, on account of the discouragement expressed by many physicians. All surgeons doing *special* work are familiar with the expressions of patients purporting to be the advice of their medical counsel, to the effect, that certain ear diseases or *symptoms*, can not be cured, and are therefore directed *not* to consult a specialist, often with the result that many cases that

could be cured, or at least much benefited, when seen early, continue to grow worse from month to month until all hearing is extinct, and it is in this unfortunate condition that the sufferer seeks the advice of a specialist, who even at that late day can often render relief as the reports of operations (by Sexton and Burnett) within the middle ear furnish ample proof.

The advances made in Otology in the past few years, demands better and more scientific treatment on the part of every practitioner of medicine—undoubtedly the lack of proper knowledge in this particular branch of medical practice, has many times, in the past brought Otological science into ridicule, but the present state of proficiency in the treatment of diseases of the ear will now permit us to speak of Otology as an *Art* with quite as much assurance of correctness as in most any other department of medicine.

The first case to be detailed is that of G. H. M. male, aged 46 years, of Vermont, his history is as follows, when 44 years of age while driving, his horses took fright and running into the embankment overturned his carriage which threw him to the ground, striking his left mastoid with sufficient force to cause unconsciousness, in which condition he remained for eleven hours, at times the respirations were so shallow and frequent and the heart's action so feeble, that the attending physician looked upon his recovery as extremely doubtful—there were neither symptoms of fracture or a diastasis in the temporal bone, such as watery discharge or hæmorrhage from the meatus.

On regaining consciousness he complained much of intense tinnitus, vertigo and vomiting, with severe pain directed to the external auditory canal and Eustachian tube, all these symptoms continued in full force (with the exception of the vomiting) at the time he consulted the writer two years subsequent to the date of accident; it is well to remark that he had control over the movements of his head, arms and legs. The symptoms as expressed by the patient on his first consultation with the writer, are quite similar to those known as "Menire's Symptoms"—marked tinnitus of an accentuated character, vertigo with rotatory sensations and consequent staggering movements followed by nausea and vomiting more or less severe, pictures on the wall appear to move around from left to right, the floor rotates from side to side at times seeming to make complete revolutions, at which moments he would feel compelled to firmly grasp any person or object within reach to prevent falling, these symptoms were increased in severity by suddenly turning the head in such a direction, that the axis of the affected ear is in the same plane as the axis around which the head is moving. Yet, sudden movements of the head in any direction usually intensified the above mentioned symptoms. The rotatory sensations and vertigo were not usually of sufficient severity to cause the patient to actually fall, and yet his normal condition was that uncertainty of gait one experiences while walking on board a ship at sea. The vertigo and tinnitus were so severe and continuous that an attendant was required to be constantly at his side to prevent any possible injury by falling.

One year after his injury, as his suffering did not abate to any appreciable extent, several surgeons in consultation thought it wise to open the mastoid cells, with the hope of lessening any pressure within, thereby relieving, if possible, the pain. This operation, however, was not of any benefit to the patient, and the operator did not find any of the parts abnormal, nor evidences of disturbance at the time of accident. Objective examination showed the osseous meatus to be much inflamed and very sensitive, with little œdema —membrana tympani inflamed and thickened, (the myringitis probably dates from the time of accident), bulging in the posterior segment of drum, quite close and parallel to the handle of the malleus—the Eustachian tube and adjacent parts were much swollen, which completely occluded the tube. Aerial

conduction of sound is entirely lost; osseous conduction quite good over mastoid.

Prior to his accident, the patient was six feet one inch in height, with well developed athletic proportions, weighing one hundred and ninety-six pounds, but his two years of suffering had reduced his weight to one hundred and thirty-one pounds, and he had the general appearance of one in the advanced stage of phthisis pulmonalis; his mental and nervous system suffered extremely, and depreciated much from their normal and naturally active condition.

Being a gentleman of much financial means, and having always been accustomed to the many pleasures and diversities that such riches bring, he, at times in utter despondency, courted death rather than continue in the miserable life he was compelled to live,

As regards treatment there appears to be but *one* rational method of procedure, and that was to puncture the membrana tympani at the point of bulging. (mentioned above); this I did by making a free incision parallel to the handle of the malleus, from the floor of the meatus to the extreme end of the malleus. The result of this operation was the escape of some semi-solid substance, dark red in color, but without any odor. The elimination of this foreign matter, immediately relieved the patient's pain and vertigo, as well as the accentuated tinnitus, rotatory sensations and staggering movements, which allowed him to stand with perfect ease and not experience the slightest inconvenience in any respect, except being overpowered with a natural desire to sleep. (the first time he secured sleep without an hypnotic or anodyne for about ten months.) The only symptom this operation did not benefit was its failure to improve the hearing, which remained the same, except the osseous conduction of sound, it being increased to normal. At the patients request, he was sent to bed, where sleep continued without interruption, for fifteen hours, and would have remained in his happy state of repose for a longer period, had not his wife became alarmed at his unusual quietude, and aroused him, being fearful of his dying as a result of the operation. Two days after this preliminary step in treatment, finding the Eustachian tube still closed, we introduced the Eustachian catheter and gently forced a warm five (5) per cent. solution of biborate of sodium through the tube into the middle ear, which found its way through the incised membrana tympani and escaped by the external auditory canal. The color and character of this solution after passing through the ear, reminded one of the discoloration of water used in syringing an ear impacted with cerumen; after cleaning the ear and tube of all obstruction, the middle ear was inflated by Politzer's method, and for the first time since the date of accident, the patient was able to hear quite loud noises. This inflation was continued daily for one week, at which time his hearing distance was $\frac{2}{20}$, at the end of three weeks (inflating three times in each week), the hearing increased to $\frac{7}{20}$. Gentle inflation was continued once per week for three months, at which time the incised membrana tympani was completely united, leaving little evidence of an cicatrix, and in appearance looked quite normal, except some slight opacity, the hearing power at this time was $\frac{14}{20}$, and the patient's health assumed its former "perfect condition." It is now three years since I treated this patient and he continues to express himself as "hearing perfectly, and uterly devoid of any unusual sensation in the head."

Another case I will but briefly mention, as it is quite similar to the above one, except the nature of the accident, and all the symptoms being less severe.

J. B. B., one of the contestants of a boxing exhibition, received a severe blow on the mastoid, which did not make him unconscious, but produced noises in his head so severe that it compelled him to abandon his evening's sport and retire for the night. Next morning the patient consulted the writer complaining of intense vertigo, tinnitus and loss of hearing in injured ear. There was no bulging of drum, but it was inflamed and painful. I punctured the drum under cocaine and syringed out the blood clot, which gave immediate relief from pain and all other symptoms. The hearing in this case was regained in sixteen days and has continued normal ever since.

As puncturing the drum is seldom, if ever, productive of ill-effects, the writer considers paracentesis of the drum, (even in acute myringi-

tis), not only as an essential, but an *imperative duty*, in all doubtful cases not promptly yielding to other methods of treatment. Acting on this theory, the writer has had the good fortune of restoring hearing in a number of cases, the loss of hearing being attributed either directly or indirectly to traumatism. An examination of the foreign matter in each case showed it to be *blood-clot*; it would therefore appear that loss or impairment of hearing, the result of hæmorrhage in the tympanum, is of much more frequent occurrence than has formerly been supposed.

1528 ARCH STREET.

A NEW AND SIMPLE METHOD TO LESSEN REACTION AFTER THE USE OF THE GALVANO-CAUTERY FOR NASAL HYPERTROPHIES.

BY J. W. GLEITSMANN, M. D.,
PROFESSOR OF LARYNGOLOGY AND RHINOLOGY IN THE NEW YORK POLYCLINIC.
NEW YORK.

In the closing remarks of a paper read last December before the Laryngological section of the New York Academy of Medicine, on the use of tri-chloracetic acid in diseases of the nose and throat,[1] the writer alluded to the beneficial effects of the acid after galvano-cautery operations in the nose. He has since that time continued his researches in this direction, and is able to report at the present on eighty applications.

Before doing so, he can not refrain from making some remarks on the general use of the acid for nasal hypertrophies, the more so as a number of publications have recently appeared which show a great difference of opinion among experimenters on the advantages of the remedy. Whilst some are fully convinced of its value as a caustic, others deprecate its use partly on account of the difficulty of applying it in the proper manner, and partly because they do not find the acid to yield the desired results.

Regarding the mode of application, the writer must say that in his experience the acid has fulfilled all that was claimed for it in the previous paper, but to achieve its end it is absolutely necessary that the acid be handled in the proper manner and with suitable instruments. The objection raised by one of the authors averse to the use of the acid, namely, that it is apt to fall off from the rod, that it is apt to spread promiscuously to other parts, does not hold good if the applicators are used which were described in the paper already referred to. The rods devised hold the acid firmly in the excavation at the distal end, and

[1] Medical Record, March 14, 1891.

allow of confining the application to the locality desired. The acid being firmly embedded in the rod, does not come in contact with any tissue which should not be touched, and, being dry, does not extend farther than to the place of application. The author who goes so far that he objects to the use of the acid because he found it difficult to fetch the crystals from the liquefied chemical, disregards the first rule of using tri-chloracetic acid. The principal benefit to which allusion has been made in my paper is the dryness of the eschar, which we can only obtain if we apply the dry acid. It was also stated that the best way to retain the acid in its crystallized form was to use only a small quantity, in a small vessel, and to rub it into the excavation of the applicators by quick movements. In this manner the liquefying of the acid can easily be prevented.

Another author finds fault with the acid, saying that it is apt to produce severer pain than chromic acid. The objection does not hold good if we use a sufficient amount of cocaine to produce local anæsthesia. With very sensitive patients, a small quantity of a weak solution of cocaine spread into the nose after the application will certainly do away with all subsequent unpleasant effect.

The writer can only state that he has used the acid uninterruptedly for eighteen months, and has not found any occasion to abandon its use, or to modify the statements made in his previous paper.

It was the endeavor of the writer for sometime past to find a suitable remedy to prevent, or at least to lessen, the unpleasant effects of the galvano-cautery for nasal hypertrophies without necessitating the patient to resort to home treatment. The effect of the galvano-cautery in nasal cavities is, in by far the greater number of cases, such an unpleasant one that without any means of relief we would often feel inclined to discard it. It was only after advising the patient to use antiseptic solutions at home that the author felt at full liberty to use the cautery whenever occasion called for it. The unpleasant feature of confining the patient more or less to the house made it the more urgent to devise a method by which after-treatment might be avoided. Agreeable results derived from the simple application of the acid to turbinated hypertrophies, the dryness of the eschar produced, made it desirable to test its efficiency as a protecting coating for the artificial wound caused by the galvano-cautery. Experiments conducted during the last eight months have resulted, as stated above, in eighty operations.

These eighty operations were performed on a total of fifty-three patients, and every one of them consisted in the application of the galvano-cautery followed immediately by a thick coating of the wound with dry tri-chloracetic acid. In addition to this, eleven patients were treated for various ailments in a similar manner, but as they did not

suffer from turbinated hypertrophy their cases were left out of consideration in this article. Of the fifty-three patients, forty-three suffered from inferior turbinated hypertrophy, to which sixty-five applications were made, the other ten from hypertrophy of the middle turbinated received fifteen applications. A careful report of each of these applications was kept in my note-book, their effect recorded at each visit, and especial attention paid to the condition of the eschar and its time of elimination. A rèsumè of these records is as follows;

To 34 patients fifty applications were made without producing the slightest unfavorable or unpleasant after-effect. The nasal cavity did not fill up, the eschar remained dry, in a few cases broke into fragments, but in none of these fifty applications did any obstructive lesion, or the slightest effect on the general system, for instance fever or debility, take place. The shortest time in which the eschar was eliminated was forty-eight hours after the operation; the longest, seven days. The removal was generally affected with very little difficulty by spraying the nose and subsequent gentle introduction of cotton, by means of a carrier, saturated with cocaine.

Subsequent treatment was confined to cleansing the nasal cavities and insufflation of an aseptic powder, for instance, aristol. In a few instances a second eschar formed after removal of the first, but it was smaller in size and of shorter duration.

The remaining fifteen applications for inferior turbinated hypertrophy were made to twelve patients, the discrepancy in the number of patients being due to the fact that several of the patients stood the first operation very well whilst the second was followed by unpleasant results. These twelve patients suffered from a number of affections following the operation, one becoming affected with tonsillitis on the fifth day, six becoming feverish and debilitated, one being even confined to bed for three days, the remaining number suffering only from subsequent fulness and obstruction of the operated nostril. Four of the last named patients were operated on both nostrils, and it was surprising that one operation did not produce the slightest discomfort, while the other, made in exactly the same manner, brought on the untoward effect.

To ten patients with hypertrophy of the middle turbinated, fifteen applications were made, twelve of which proved entirely successful without any unpleasant after sensation, whilst in three applications there was once fulness of the nostril, twice slight febrile reaction.

The total eighty applications were, therefore, followed in eighteen cases only by one or the other unpleasant symptoms, whilst the remaining sixty-two were not felt by the patients at all. This expressed in percentage gives seventy-seven per cent. to twenty-three per cent, in other words, over three-fourths of all the applications were made with-

out any discomfort to the patient. It may be in place to state here again, that after all these operations no after-treatment was instituted, that after the application of the acid to the cautery-wound, the patient was allowed to go home without using any other appliance until he returned to the office.

In conclusion, a few words about the manner of operating. For inferior turbinated hypertrophy, in all cases but one, the galvano-cautery point was used. It was brought to a white heat and slowly carried from backwards forwards till it cut through the whole thickness of the hyperplastic tissue. The operation was generally not considered concluded before the bony structure of the turbinated was felt under the cautery point. As soon as the bleeding had stopped the nasal cavity was dried with absorbent cotton and tri-chloracetic acid applied to the wound. Generally the quantity of the acid contained in one rod only, is not sufficient to give a thorough coating to a wound running the whole length of the inferior turbinated, and two or three rods are necessary to produce a thick layer of the acid over the wound. In a similar manner hypertrophies of the middle turbinated were treated, but they were destroyed by a flat electrode instead of a pointed one, and subsequently the acid applied.

46 East 25th Street.

REVIEWS.

The Refraction of the Eye. By Gustavus Hartridge, F. R. C. S. Fifth Edition. Phila.: P. Blakiston, Son & Co., 1891. Price $2.00.

A work that has gone through five editions may well bid defiance to the critic, should any one be so bold as to assume that role. The book is well written, handsomely printed, largely illustrated, and, in our opinion the most concise, clear, conservative and "practical" Manual of Refraction published.

Diseases and Refraction of the Eye. By N. C. Macnamara, F. R. C. S., and Gustavus Hartridge, F. R. C. S. Fifth Editon, Phila.: P. Blakiston, Son & Co.

A good book for the student.

The Physician's Visiting List (Lindsay & Blakiston's) For 1892. Phila.: P. Blakiston, Son & Co. Price from $1.00 to $3.00 according to size.

This standard Visiting List is one of the best. It is simple in its arrangement, and sufficiently large for the busy physician. Its table of contents is all that could be desired. The section on "Diagnosis and Treatment of the Simpler Superficial Diseases of the Eye" by Dr. Geo. M. Gould, of Philadelphia, deserves special mention.

PROGRESS.

NOTES FROM FOREIGN OPHTHALMIC JOURNALS.

By Casey A. Wood, C. M., M. D.,
of Chicago.

We are all familiar with the conjunctival hyperæmia, chronic thickening and occasional localized conjunctivitis occasioned, as is usually believed, by the presence of one or more tarsal cysts, but Prof. Dianoux, of Nantes, claims that a definite form of conjunctivitis is not only associated with, but is the direct cause of Meibomian tumors. (*La conjunchörte à chalozion. Archives d'ophthalmologie Imllet—Août*, p. 302; 1891.)

The disease may be acute, but is usually chronic, and affects by preference, the anterior half of the palpebral conjunctiva. The symptoms are those of conjunctival hyperæmia with little or no superabundant secretion. The mucosa becomes thickened and at the external canthus the mucous follicles are engorged. These signs and symptoms may remain constant for many months. When the "foreign body" sensations persist, passing the finger over the tarsal conjunctiva, will almost always reveal minute nodes beneath it. Later chalazia develop and are easily made out. Should these disappear the disease is apparently cured, but the original conjunctivitis still remains, and after a longer or shorter time, other tumors present themselves. Writer has seen as many as fourteen chalazia in the four lids.

Apparent cure followed by relapses may occupy years. Both eyes are commonly affected, but unequally.

The diagnosis, Dianoux admits, is difficult in the absence of chalazia, and the palpebral signs are usually set down as catarrhal conjunctivitis, or as an accompaniment of accommodative asthenopia. Finally, the presence of tarsal nodosities settles the question.

The prognosis is not very favorable, and the disease being essentially chronic, may give rise to a great deal of ocular discomfort, and greatly interfere with the use of the eyes, for both near and distant work. At first, it makes it difficult or impossible to read or write towards evening, while later on, morning labor becomes equally uncomfortable. This may persist for many months in spite of all treatment.

The author believes chalazion conjunctivitis to be of parasitic origin, that the organisms, first obtaining a foot-hold in the congested mucous membrane, attack the underlying glands, and so the chalazia develop.

Treatment should be especially directed to the *fons et origo mali*—the conjunctivitis, and should be persisted in, if need be, for months. As soon as chalazia show themselves, they call for surgical treatment. The writer prefers a weak solution (1:2000) of argentic nitrate to sublimate, boric acid, cupric sulphate or other antiseptic mixtures. The eyes may be steamed before using the nitrate. With timid individuals, when the tumors are small and stationary, a small quantity of the following oirtment may be applied to the palpebral skin—a massage of five minutes duration—afterwards allowing the mixture to remain in situ for five

minutes longer: Potass. iodide, . . 1.0.
Ungt. hydrarg, . . 6.0 to 8.0. Considerable swelling and redness result, but the chalazion either diminishes in size or entirely disappears

Refractive errors should be carefully corrected.

In the very acute cases, with much secretion and mucous swelling, silver nitrate (2 per cent. to 3 per cent.) solutions and scarifications are called for.

True asserts that the lymphatic habit is generally recognizable in individuals afflicted with granular ophthalmia, (*Lymphatisme et trachome. Annales d'oculistique, Août*, p. 80, 1891); it favors the development and modifies the course of trachoma; it is the chief factor in the corneal complications of the disease; it favors the trachomatous contagion in proportion to its extent.

In the same number (*Prophylaxie de l'ophthalmie des nouveaux-nés par l'insufflation de poudre d'iodoforme*, p. 96), Valude furnishes many arguments in favor of the insufflation of finely divided iodoform powder as against Crédé's method in the treatment and prophylaxis of ophthalmia neonatorum. In Tarnier's service where about 2 per cent. of the women receive antiseptic vaginal injections, the infant's eyes were (before tying the cord) treated, some by Crédé's method and others by the insufflation of iodoform and an antiseptic bandage. The first plan was tried on 218 infants who furnished 13 ophthalmias, (8 at full term, 5 premature), or 5.9 per cent. The iodoform treatment of 248 full term children gave 5 ophthalmias, or 2 per cent.

The objections to the Crédé method in the hands of midwives are, (1), that a 2 per cent. solution of argentic nitrate is so powerful that it cannot be obtained except by a physician's prescription; (2), a *single drop* of any solution is not easily instilled; it often does not get into the eye; (3), it decomposes readily and loses its potency; (4), it may induce in some eyes a true catarrhal ophthalmia. The iodoform treatment is not open to these objections.

Finally one or more of the objections raised in the case of silver nitrate apply with equal force to corrosive sublimate solutions, that are strong enough to act as prophylactics.

Hirschberg (*Zur operativen Behandbung der Netzhautablösung. Centralblatt—f. prakt. augenh.* Oct. 1891), gives an interesting account of the successful treatment of a case of retinal detachment. The patient was a young woman æt. 27, shortsighted, who came with a well marked restriction of one visual field. Reads Sn. 1½ at 5″, both eyes. The detached retina was not torn; the vitreous was not cloudy and there was no diminution of tension. Pilocarpine, rest and bandage gave no permanent results.

Two years afterwards patient returned much worse. Sn. 2½ at 4″ slowly. The perimetric defect now corresponded to a retinal detachment, which began two disc-diameters from the papilla and extended as a globular, bluish, delicate swelling outwards and upwards, increasing in size as it reached the periphery. No rupture, no vitreous cloud, no metamorphopsia—although the lesion affected the macular region.

Operation under cocaine. Patient sat on a common chair, head resting on chest of assistant, who carefully parted the lids with his fingers,

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The prognosis is not very favorable, and the disease being essentially chronic, may give rise to a great deal of ocular discomfort, and greatly interfere with the use of the eyes, for both near and distant work. At first, it makes it difficult or impossible to read or write towards evening, while later on, morning labor becomes equally uncomfortable. This may persist for many months in spite of all treatment.

The author believes chalazion conjunctivitis to be of parasitic origin, that the organisms, first obtaining a foot-hold in the congested mucous membrane, attack the underlying glands, and so the chalazia develop.

Treatment should be especially directed to the *fons et origo mali*—the conjunctivitis, and should be persisted in, if need be, for months. As soon as chalazia show themselves, they call for surgical treatment. The writer prefers a weak solution (1:2000) of argentic nitrate to sublimate, boric acid, cupric sulphate or other antiseptic mixtures. The eyes may be steamed before using the nitrate. With timid individuals, when the tumors are small and stationary, a small quantity of the following ointment may be applied to the palpebral skin—a massage of five minutes duration—afterwards allowing the mixture to remain in situ for five

minutes longer: Potass. iodide, . . 1.0.
Ungt. hydrarg, . . 6.0 to 8.0. Considerable swelling and redness result, but the chalazion either diminishes in size or entirely disappears

Refractive errors should be carefully corrected.

In the very acute cases, with much secretion and mucous swelling, silver nitrate (2 per cent. to 3 per cent.) solutions and scarifications are called for.

True asserts that the lymphatic habit is generally recognizable in individuals afflicted with granular ophthalmia, (*Lymphatisme et trachome. Annales d'oculistique, Août*, p. 80, 1891); it favors the development and modifies the course of trachoma; it is the chief factor in the corneal complications of the disease; it favors the trachomatous contagion in proportion to its extent.

In the same number (*Prophylaxie de l'ophthalmie des nouveaux-nés par l'insufflation de poudre d'iodoforme*, p. 96), Valude furnishes many arguments in favor of the insufflation of finely divided iodoform powder as against Crédé's method in the treatment and prophylaxis of ophthalmia neonatorum. In Tarnier's service where about 2 per cent. of the women receive antiseptic vaginal injections, the infant's eyes were (before tying the cord) treated, some by Crédé's method and others by the insufflation of iodoform and an antiseptic bandage. The first plan was tried on 218 infants who furnished 13 ophthalmias, (8 at full term, 5 premature), or 5.9 per cent. The iodoform treatment of 248 full term children gave 5 ophthalmias, or 2 per cent.

The objections to the Crédé method in the hands of midwives are, (1), that a 2 per cent. solution of argentic nitrate is so powerful that it cannot be obtained except by a physician's prescription; (2), a *single drop* of any solution is not easily instilled; it often does not get into the eye; (3), it decomposes readily and loses its potency; (4), it may induce in some eyes a true catarrhal ophthalmia. The iodoform treatment is not open to these objections.

Finally one or more of the objections raised in the case of silver nitrate apply with equal force to corrosive sublimate solutions, that are strong enough to act as prophylactics.

Hirschberg (*Zur operativen Behandbung der Netzhautablösung. Centralblatt—f. prakt. augenh.* Oct. 1891), gives an interesting account of the successful treatment of a case of retinal detachment. The patient was a young woman æt. 27, shortsighted, who came with a well marked restriction of one visual field. Reads Sn. 1½ at 5″, both eyes. The detached retina was not torn; the vitreous was not cloudy and there was no diminution of tension. Pilocarpine, rest and bandage gave no permanent results.

Two years afterwards patient returned much worse. Sn. 2½ at 4″ slowly. The perimetric defect now corresponded to a retinal detachment, which began two disc-diameters from the papilla and extended as a globular, bluish, delicate swelling outwards and upwards, increasing in size as it reached the periphery. No rupture, no vitreous cloud, no metamorphopsia—although the lesion affected the macular region.

Operation under cocaine. Patient sat on a common chair, head resting on chest of assistant, who carefully parted the lids with his fingers,

The surgeon seized the globe with the fixation forceps, out-and-above. as far as possible behind the equator, and plunged a Graefe's knife close to the forceps, deep into the interior of the eye, *turned it around at right angles, and then drew out the instrument*, making visible, for an instant, the black opening of the sclera. Then with the forceps *he seized the conjunctival submucosa and gently drew it away from the bulb.* This *suction* action caused the sub-retinal fluid to form a bladder-like tumor underneath the bulb or areolar tissue. Afterwards a bandage and rest in bed for 12 days.

The result was a complete cure of the disease. The eye read the finest types and the F. of V. was absolutely normal. The external wound healed by first intention, while the fundus changes were found to be only those marked by the entrance of the cataract knife.

It is objected that this operation is inferior to iodine injections and has but transitory results, and that a reoccurrence of the detachment may be looked for in about 14 days. This case has remained cured for six weeks. The writer had another patient, operated upon in a similar manner, that was quite well a year afterwards when he disappeared.

Nieden (*Thränensecretion als Reflexers cheinung von Schwangerschoft Tehender's klin Monatsbl*, Oct. 1891) has a short but instructive article on the rather rare occurrence of epiphora as a reflex symptom in pregnancy. The case was as follows: A 25 year old primipara suffered from marked nausea and ptyalism, which persisted for two months. At the beginning of the third month, the mucous excretion and the nausea abated, but excessive and annoying bilateral lachrymation took their place. This began in the morning as soon as the patient opened her eyes and continued all day, whether she exposed herself to wind or remained in-doors, whether she used her eyes much or little. The secretion of tears was so excessive that her eyes were always full, and she was obliged to keep up a continued winking to get rid of the overflow. There was nothing in the condition of the lachrymal apparatus to account for this state of things. The eczematous redness of the palpebral skin and cheeks were simply effects of the marked epiphora. No fluid could be pressed out of the sac, and the nasal duct was proven to be potent to lachrymal injections. There was nothing abnormal about the conjunctiva.

The exits of the lachrymal ducts seemed to be swollen, and were plainly made out.

A partial examination of the fluid showed it to have a weak alkaline reaction.

Otherwise the eye was quite normal.

A single drop of a 5 per cent. solution of cocaine acted in this case like a charm. The abnormal secretion disappeared, the mucous membrane and swollen tear ducts resumed their healthy paleness and the patient was practically well. This marked improvement continued even after the anæsthetic effects of the cocaine had passed off, but after giving a prescription for further use, the patient did not return. Hence, Nieden concludes that the remedy acted by permanently reducing the amount of the lachrymal secretion, or it became normal in quantity with the setting in of lactation or the awakening of glandular secretion in some other organ.

NOTES FROM AMERICAN OPHTHALMIC JOURNALS.

By B. E. Fryer, M. D.,
KANSAS CITY, MO.

RETINITIS DIABETICA.

Dr. H. Friedenwald, (Vol. xx, No. 4, *Knapp's Archives of Ophthalmology*), in an interesting paper, calls attention to the fact that "Retinitis Diabetica" has hitherto been the name of retinal inflammations depending on diabetes, without signifying any peculiar disease which could be recognized by its definite and characteristic appearance. The various forms in which it had been seen and described were considered very much the same as those of albuminuric retinitis. Thus Noyes, in his text book, published in 1890, says, "that the features of both, are to a great degree, identical."

Friedenwald also quotes from Loring's work (2d Vol.) where the following occurs: "The diabetic form of retinitis offers little which is distinctive of presence of sugar in the urine. As a rule, however, there is more hæmorrhage and less exudation or white plaques than in retinitis albuminurica, and the spots are similar and not so apt to be situated in the macula or grouped in a zonular manner about the papilla."

Gowers is quoted also by Friedenwald as scarcely more accurate. In the last edition of Gowers' work on ophthalmoscopy he describes the retinal "changes" as bearing considerable resemblance to those seen in some cases of pernicious anæmia. . . . White spots of degeneration are frequently present, commonly of moderate size, scattered over the fundus. . . . They differ from the patches of albuminurica retinitis in *shape*, having less tendency to assume a circular form; in color having a more dingy shade of white, and in grouping, the star around the macula being seldom seen, although there is a tendency for the spots to be arranged in the form of incomplete rings."

Other authorities, American, English and German, it is stated by Friedenwald, are equally unsatisfactory. [Tyson in his work on Bright's disease, is more clear as to the retinal differences between diabetes and Bright's disease.—B. E. F.]

Friedenwald says: "That characteristic differences do exist between diabetic retinitis and other forms of of retinal inflammation, was pointed out several years ago by Prof. Hirschberg, of Berlin. In a more recent article he demonstrates that there are typical forms of diabetic retinitis which present characteristic appearances."

"The number of cases upon which he bases this study is very large, comprising twenty-five cases, which is a greater number than has hitherto been published by any single observer. He distinguishes three kinds of retinal disease that occur in diabetic patients. First, a very characteristic inflammation of the central part of the retina with small bright spots, and usually fine spots of blood. Second, hæmorrhages of the retina, with the consequent inflammatory and degenerative changes, including hæmorrhages into the vitreous, hæmorrhagic infarction of the retina, and hæmorrhagic glaucoma. Third, rare forms of retinal inflammation and degeneration, whose connection with the constitutional disease yet remains to be demonstrated. There are of course intermediate forms, presenting the characteristic features of more than one type."

"In the first class we find small, white, shining spots in the central

part of the retina. These lie in the retinal tissue."

"In the macular region they are most marked, often forming little semi-circles or curved streaks, with minute indentations along their margins. They may become confluent and form long streaks, though they rarely present the stellate form of albuminuric retinitis. A few bright spots may be seen scattered over the retina to the nasal side of the papilla. They never cause any disturbance of the retinal pigment. Fine hæmorrhages may be visible throughout the region affected and beyond it in the form of dots, small spots and fine streaks. In these cases the papilla is not altered, either its color or its margin; there is no diffuse haziness of the retina, nor are there any visible changes in the blood vessels, such as variation in calibre. Large opacities of vitreous are not found in this form. It is this type that is pathognomonic of diabetes. The disease occurs in persons of from forty-five to sixty-five, who have commonly suffered with diabetes for a long time, often for several years, occasionally though to such a slight extent that their general disease remained undetected before the eyes became affected. It usually develops gradually and always affects both eyes. The visual disturbance is due to central scotoma. Vision ranges from $\frac{1}{2}$ or $\frac{1}{3}$ to $\frac{1}{10}$ or $\frac{1}{20}$, but not to complete blindness. It may improve and the patient may have paresis of the accommodation at the same time."

"Hirschberg believes that these white spots owe their origin to changes in the finest blood-vessels; as mentioned above the larger vessels appear normal. Their histology is not known."

Friedenwald reports a typical case.

NOTES FROM OTOLOGICAL LITERATURE.

By T. Melville Hardie, B. A., M. D.

PROFESSOR OF LARYNGOLOGY AND RHINOLOGY, CHICAGO POST-GRADUATE MEDICAL SCHOOL.

De la Surdité déterminée par le tympan ou les osselets dans l'otite moyenne sèche, et des moyens d'y remédier. Par le Dr. C. Miot. Revue de Laryngologie, d'Otologie et de Rhinologie. 1891 Nos 15, 16, 17.

The operation of excision of the membrana tympani and of one or more ossicles is the last resort in the treatment of dry otitis and is practiced when other treatment has failed to give any result.

The operation is indicated:

1. Whenever an artificial perforation of the drum head sensibly improves the hearing *e. g.* when the hearing distance for the watch is increased by the operation from 3 or 4 cm. before to 20 or 25 cm. after.
2. When the chain of ossicles and the tympanic membrane have lost their mobility in consequence of fibrous and calcareous degeneration of synechiæ.
3. Patients who generally receive most benefit from the operation are those afflicted with paradoxical deafness and perceive the diapason-vertex better in the deafer ear.
4. In cases of mono-auricular deafness with tinnitus which tends to affect the psychological condition of the patient.
5. The operation is far from being urgent in those cases of one sided deafness without other subjective symptoms.

6. It is contra-indicated in all cases in which the subjective symptoms have a nervous origin either reflex or central.

Conclusions: The removal of the membrana tympani and of the hammer is sufficient in all cases in which the membrana is very much thickened and where the movements of the chain of ossicles are free.

It is necessary on the other hand to remove the ambos as well where there is rigidity of the chain of ossicles and in all cases where one fears to see cicatricial tissue replace the membrana tympani.

Unpleasant sequelæ are unlikely if the operation is performed properly. There sometimes supervenes an inflammation with a more or less abundant secretion which as a rule quickly subsides, but persists in exceptional cases for several months.

The result of the operation is in general very favorable as regards both deafness and tinnitus even in unlikely and long standing cases. The tinnitus is almost always diminished and disappears in the majority of cases; the author has however seen it increased in one patient. The hearing improves noticeably, sometimes in a remarkable fashion. For the purpose of producing a moist condition of the mucous membrane, it is advisable to use, beginning some weeks after the operation and when all traces of hyperæmia has disappeared, the following instillation:

℞. Iodine bisublimated . . . 0.01
Liquid Vaseline . . . 80.

Four or five drops are to be used, at first every second day, then every fourth or fifth day. The intervals may later be increased.

We have space for a word only about Miot's method; its distinguishing feature is the leaving of a small pedicle of membrane in the middle line of the floor of the meatus while the other incisions are being made. By the attachments above and below the drum-head is steadied. For a detailed description of the operation, possible complications and accidents, after treatment and case histories the reader is referred to the paper itself which is one of considerable merit.

"Ueber Nerven atrophie im Inneren Ohre." *Habermann Zeitschrift für Heilkunde* xii., 4, 5.

Habermann's observations showed that the atrophy was principally confined to the nerves distributed to the beginning of the basal turn of the cochlea; only infrequently did it extend to the the middle turn. This corresponds with the observation made long ago that in high degrees of deafness the perception for the highest notes of the scale is frequently the first to disappear. It agrees also with Helmholtz' theory as to the functions of the cochlea. The atrophy in cases such as these may be considered as due to lack of use ("atrophy of inaction"); the intensity of the highest tones being generally speaking more limited, and further, that in the higher degrees of deafness obstacles to air conduction e. g. the development of connective tissue in the neighborhood of the fenestræ, are more often present.

The fact that the atrophy is a quantitative one was recognized by the marked decrease in the number of the nerve fibres. Evidences of degeneration were seen in only one case (Wiegert's Staining). The number of ganglion cells in Rosenthal's canal was also correspondingly diminished.

To secure a basis for comparison and in order to estimate the aver-

age size of the nerve bundle in the lamina spiralis, Habermann examined them in forty-six cases affected by the most various diseases. In twenty-three the size was considered normal, a certain variation in the normal being admitted. The size was greatest in thirteen new born and children; the remaining nine were also young, the oldest being thirty-eight.

In eleven cases, with two exceptions over sixty years of age, the atrophy was found to be usually at the beginning of basal turn of the cochlea. In these the probable cause was considered to be senile marasmus.

In twelve cases there was general atrophy of various degrees. the ages were various and the diseases were also of no single type, but those which had evidently begun in the middle ear and had extended to the labyrinth were the most common. In one case examination discovered absence of the nerve in the spiral turn with general atrophy toward the base of the cochlea.

Habermann concludes that these changes in the nervous apparatus of the inner ear frequently occur, even if we have not always exact conclusions to offer as to their etiology. They are especially common after purulent inflammation of the middle ear.

NOTES FROM LARYNGOLOGICAL AND RHINOLOGICAL LITERATURE.

By M. D. Lederman, M. D.,

SURGEON TO THE NOSE AND THROAT DEPARTMENT OF THE YORKVILLE HOSPITAL FOR DISEASES OF WOMEN AND CHILDREN; CLINICAL ASSISTANT TO THE THROAT DEPARTMENT OF THE MANHATTAN EYE AND EAR HOSPITAL, ETC., NEW YORK.

THE CURE OF ANÆMIA BY INTER-NASAL OPERATIONS

The surgery of the nasal passages has lately taken proportions far greater than ever before, and, we doubt not, may have been subject to the exaggeration which falls to the share of all new worthy procedures. There is no doubt, however, that all considerable contractions in the air-admitting capacity of the nasal passage may be, and often are, productive of harm. We note some recent researches made by Dr. H. Holbrook Curtis, of New York, in which the benefit derived from intra-nasal surgical measures by patients suffering from the anæmia which this author considers as inseparable from nasal stenosis, is shown by spectroscopeic examination of the blood, in reference to the amount of oxy-hæmoglobin contained before and after the operation. He has found that after the operation there is a constant increase in percentrge of oxy-hæmoglobin contained in the blood, and concludes from his results that the increase of this substance is directly proportional to the relief which is afforded an impeded nasal respiration.

These results are the more striking, since in only one of the cases treated by Dr. Curtis, were other remedial measures employed, and the cure of the anæmia seems to have been directly attributable to the removal of the diseased condition of the nasal passages. The author states that patients should not be operated upon when blood shows, by spectrum analysis, lower than six per cent. of hæmoglobin.—*The International Journal of Surgery*, Vol. iii, No. 2.)

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IN CONJUNCTION WITH

DR. B. E. FRYER, 519 East 9th St., ... KANSAS CITY, MO.
DR. CASEY A. WOOD, 204 Dearborn St., ... CHICAGO, ILLINOIS.
DR. T. MELVILLE HARDIE, 240 Wabash Ave., . . CHICAGO, ILLINOIS.
DR. M. D. LEDERMAN, 1029 Park Ave., ... NEW YORK, N. Y.

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INTRODUCTION.

We think our readers will appreciate the assignment of our available space to original papers and reports, rather than to extended introductory editorial remarks.

We now wish only to state that it shall be our aim and care that the ANNALS OF OPHTHALMOLOGY AND OTOLOGY shall assume and maintain a standing at once, eminently scientific and thoroughly practical. It is believed that the select class of busy practitioners by whom the ANNALS will be read, desire this union of science and usefulness.

Neither labor nor expense will be spared in improving the Journal, and maintaining its high scientific and useful character.

Instructive papers on Medical Ophthalmoscopy and the Pathological relations of the Eye, Ear, Nose and Throat to the general system, and *vice versa*, will be presented in future numbers of the ANNALS, in a form that will be of infinite practical value to the General Surgeon and Physician, as well as to the Specialist.

Hereafter this Journal will contain, under the head of Progress, a *complete, systematic, and early* review of the current Ophthalmological,

Otological, Laryngological and Rhinological literature of the world, prepared by the following collaborators: Dr. B. E. Fryer, of Kansas City, Mo., Drs. Casey A. Wood and T. Melville Hardie, of Chicago, Ill., and Dr. M. D. Lederman, of New York.

NEW INSTRUMENTS.

Dr. Edward Jackson is the author of a plain and inexpensive Ophthalmoscope which he has called the POLYCLINIC. The simplicity of the instrument is illustrated by the cut.

The lens series is furnished by combinations of six lenses in two slides, and consists of convex 1, 2, 3, 4, 6, and 12 dioptres; concave 1, 2, 4, 6, 10, and 22 dioptres.

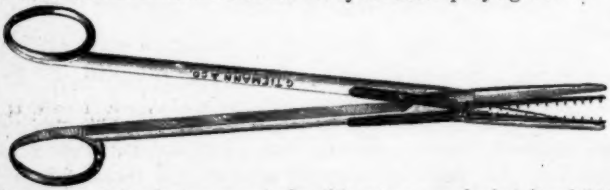
The slides, containing the lenses, are retained in position by a spring stop.

It has a circular tilting mirror.

For general use the POLYCLINIC OPHTHALMOSCOPE is as satisfactory as many of the high priced instruments. It is made by Mr. D. V. Brown, 734 Sansom Street, Philadelphia.

NASAL SCISSORS.

The satisfactory and easy manner of removing turbinated tissue with scissors suggested the instrument illustrated by the accompanying cut.



Experience led to improvement after this cut was made, but it exhibits the principle. The improved scissors as now made by Messrs. George Tiemann & Co., of New York, and known as Dr. James P. Parker's Nasal Scissors, are straight, and made as light as consistent with strength. The blades are three inches. The claws have transfixion teeth one-fourth inch apart, the first being one-fourth inch from points of blades. The claws rest against the blades but are not attached to them. The teeth transfix the tissue before the edges of the blades come in contact with it, and the claw-bars spring, allowing the scissors to close. The claws prevent slipping and holds the severed piece until it is brought out. If the hæmorrhage be profuse after the tissue has been removed and the nasal cavity cleansed with hot water, a thin rubber bag of suitable size is passed well into the naris, by means of an Eustachian catheter, and distended with water by tying the mouth of the bag over a filled ear syringe. Traction is made on protruding end of bag and a string tied around it near the nostril so that it disappears from view after the surplus rubber has been cut away. The bag is perforated, usually on the second day, allowing the water to escape, after which the rubber remains in the nostril about 24 hours and is then removed easily.